University of Alberta
Printing Department

CALENDAR

of the

University of Alberta

Fifty-seventh Session

1964-65

The University of Alberta is a co-educational, publicly-supported institution, possessing the sole right of conferring degrees, other than degrees in Divinity, within the Province of Alberta. It is a member of the Association of Universities of the British Commonwealth, of the National Conference of Canadian Universities and Colleges and of the International Association of Universities.

Instruction at the University began in September 1908, in the Faculty of Arts and Science, which was first officially so designated in 1914. In 1963, the Faculty at Edmonton became the separate faculties of Arts and of Science. Teaching in other fields was established as follows: 1912—Law; 1913—Medicine and Engineering; 1914—Pharmacy; 1915—Agriculture; 1917—Dentistry; 1918—Household Economics; 1924—Education and Nursing; 1928—Commerce; 1950—Physical Education; 1954—Physiotherapy; 1960—Occupational Therapy; 1961—Dental Auxiliary; 1962—Dental Hygiene. Graduate Study began slowly in the early years but has increased rapidly since 1950; the Faculty of Graduate Studies was established in 1957.

The Department of Extension was initiated in 1912, and the Banff School of Fine Arts in 1933.

University classes began at Calgary in 1946; the first year of Arts and Science was provided in 1951, and the first year of various degree courses and the second and later years of some have gradually been added. The University at Calgary issues its own calendar.

In Edmonton, the University possesses 878 acres (campus, 154 acres; farm, 724 acres.) Additional land adjoining the campus is gradually being acquired for future development. The campus, located about two miles from the business centre, borders the wooded southern bank of the North Saskatchewan river. It contains some fifteen major teaching and research buildings, in addition to student residences, service buildings and two affiliated colleges. Adjoining are the Alberta Research Council, the Provincial Laboratory of Public Health, two teaching hospitals and the Northern Alberta Jubilee Auditorium.

At Calgary, the new campus extends to about 320 acres, and is situated on the Banff Highway, at the western limits of the city. The four buildings in Calgary are designed to house Arts and Education, Science and Engineering, Physical Education and the Library.

The Banff School of Fine Arts, which is administered by the University, is located in the mountains. A few courses for university credit may be taken there in the summer months.

As this calendar is published a considerable time before the opening of the Session, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular courses.

Date of issue: July, 1964.

Printed by the University of Alberta

CONTENTS

		Page
I.	Academic Schedule	5
II.	Programs of Study	12
III.	Admission Requirements and Procedures	14
IV.	Registration and Fees	18
V.	General Regulations	25
VI.	Student Services and Student Affairs	32
VII.	Agriculture	41
VIII.	Arts	79
IX.	Commerce	153
X.	Dental Hygiene	169
XI.	Dentistry	179
XII.	Education	197
XIII.	Engineering	245
XIV.	Household Economics	295
XV.	Law	303
XVI.	Medicine	313
XVII.	Nursing	343
XVIII.	Pharmacy	357
XIX.	Physical Education	371
XX.	Rehabilitation Medicine	389
XXI.	Science	403
XXII.	Graduate Studies	467
XXIII.	Awards and Financial Assistance	523
XXIV.	General Organization of the University	661
	Index	
	Map and Directory of the Edmonton Campus	

I

Academic Schedule

1964 CALENDAR 1964

S	M	T	W	T	F	S
JANUARY						
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
FEBRUARY						
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
MARCH						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
APRIL						
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
MAY						
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..
JUNE						
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
JULY						
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
AUGUST						
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..
SEPTEMBER						
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
OCTOBER						
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
NOVEMBER						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..
DECEMBER						
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	**28**	**29**	**30**	**31**	..	..

1965 CALENDAR 1965

S	M	T	W	T	F	S
JANUARY						
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..
FEBRUARY						
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	..	..	..	..	..	..
MARCH						
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
APRIL						
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
MAY						
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..
JUNE						
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
JULY						
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
AUGUST						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
SEPTEMBER						
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
OCTOBER						
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..
NOVEMBER						
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
DECEMBER						
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

1966 CALENDAR 1966

S	M	T	W	T	F	S
JANUARY						
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..
FEBRUARY						
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	..	..	..	..	..
MARCH						
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
APRIL						
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
MAY						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
JUNE						
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
JULY						
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..
AUGUST						
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
SEPTEMBER						
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
OCTOBER						
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..
NOVEMBER						
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
DECEMBER						
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

I—ACADEMIC SCHEDULE, 1964-65

1964

July—

Wednesday, 1—

Fifty-eighth University year begins.

Thursday, 2—

8:00 a.m.—Summer Session lectures begin.

9:00-11:00 a.m. and 12:00 noon to 2:00 p.m.—Confirmation of registration of Summer Session students.

Thursday, 9—

Last day for payment of 1964 Summer Session fees.

Wednesday, 15—

Last day for application for Graduate degrees, and degrees in Arts, Science, Education and Pharmacy to be conferred at Fall Convocation.

August—

Tuesday, 4—

Last day for students with unsatisfactory university records to notify the Student Counselling Services that they are seeking re-admission.

Last day for receiving formal applications for admission except in M.D. (April 1), D.D.S. (May 15) and Graduate programs (August 31). Last day also, for receiving formal applications for transfer from one campus of the University to the other.

Last day for receiving applications for supplementals in Medicine and Dentistry (including the School of Dental Hygiene).

Tuesday, 11—

Last day for receiving applications for September supplementals.

Friday, 14—

Summer Session ends.

Monday, 17—

Supplemental examinations begin in Medicine, Dentistry and the School of Dental Hygiene.

Monday, 31—

Last day for receiving formal applications for admission to the Faculty of Graduate Studies.

Last day for receiving registrations in the Evening Credit Program (including students in the Faculty of Graduate Studies). Applications for admission from new students must have been received by the deadlines referred to above.

September—

Tuesday, 1—

Supplemental examinations begin except in Medicine and Dentistry (see August 17)

Monday, 7—

Labor Day; University buildings closed.

Tuesday, 8—
9:00 a.m.—Registration of all students in the D.D.S. Program.
2:00 p.m.—Registration of all students in the M.D. program.

Wednesday, 9—
8:00 a.m.—Lectures begin in second, third and fourth years in faculties of Dentistry and Medicine.

Wednesday, 9 and Thursday, 10—
Orientation exercises for first year Medical and Dental students.

Thursday, 10—
9:00 a.m.—Registration of students in the School of Dental Hygiene.

Friday, 11—
Lectures begin in first year in faculties of Dentistry and Medicine, and the School of Dental Hygiene.

Monday, 14—
Registration of students in the Faculty of Law.

Monday, 14 to Saturday, 19—
Last week for submission to the Dean of Graduate Studies of approved Graduate Program forms.

Tuesday, 15—
8:00 a.m.—Lectures begin in the Faculty of Law.
Last day for filing by M.D. and D.D.S. students of applications for grants and loans under Students' Assistance Act.

Monday, 21—
Last day for submission of theses by graduate students expecting to receive their degrees at Fall Convocation.

Monday, 21 to Thursday, 24—
Registration of all students in Agriculture, Arts, Commerce, Education, Engineering, Graduate Studies, Household Economics, Medical Laboratory Science, Nursing, Pharmacy, Physical Education, Rehabilitation Medicine, and Science, according to published schedule.

Friday, 25—
Regular lectures begin for all students registering in previous four days.
First day of registration of B.D. students.

Saturday, 26—
Special supplemental examinations.

Monday, 28—
Evening Credit Program classes begin.

October—

Thursday, 1—
Last day for filing by other than M.D. and D.D.S. students of applications under the Students' Assistance Act.

Wednesday, 7—
Last day for changes in registration in Agriculture, Arts, Commerce, Education, Engineering, Household Economics, Medical Laboratory Science, Nursing, Pharmacy, Physical Education, Rehabilitation Medicine, and Science.

Thursday, 8—
Last day for oral examinations of Masters and Doctoral candidates for Fall Convocation.
Saturday, 10—
Last day for registration of B.D. students.
Monday, 12—
Thanksgiving Day; University Buildings closed.
Thursday, 15—
Last day for payment of undergraduate fees.
Saturday, 31—
Notice of intention to be absent from Fall Convocation must be given by 12:00 noon.

November—
Saturday, 7—
(afternoon)—Fall Convocation (to be held in Edmonton).
Monday, 9 to Saturday, 14—
Test Week.*
Wednesday, 11—
Remembrance Day; lectures and laboratories withdrawn.
Thursday, 19—
Fall meeting of Committee on Student Affairs.

December—
Tuesday, 15—
Last day for receipt of applications for Certificates of Post-Graduate Qualification in Medicine.
Saturday, 19—
12:00 noon—Lectures end, and Christmas vacation begins.

1965
January—
Sunday, 3—
Christmas vacation ends.
Monday, 4—
8:00 a.m.—First term lectures resume.
Monday, 4 to Saturday, 9—
Mid-session examinations for students in School of Dental Hygiene.
Monday, 4—
Last day for filing second term applications for grants and loans under the Students' Assistance Act.
Saturday, 9—
Last day of lectures in the first term except in the D.D.S., LL.B. and M.D. programs.
Monday, 11 to Saturday, 16—
Mid-session examinations, except in the D.D.S., the LL.B. and the M.D. programs, and in the School of Dental Hygiene.
Friday, 15—
Last day for payment of second instalment of fees.
Monday, 18—
Second term lectures begin.

February—

Friday, 5—

Last day for application for Graduate Degrees and degrees in Arts, Science, Education and Pharmacy, to be conferred at Spring Convocation.

March—

Thursday, 18—

Spring meeting of Committee on Student Affairs.

Friday, 19 to Sunday, 21 (inclusive)—

Second term recess.

Monday, 29—

Last day for receiving applications for supplemental examinations to be written in April.

April—

Thursday, 1—

Last day for receipt of applications for admission from new students, undergraduate or graduate, who wish to enter the University in the 1965 Summer Session.

Last day for receiving applications for admission to Medicine.

Saturday, 10—

Last day of lectures in fourth year Dentistry.

Monday, 12—

Clinical period begins in fourth year Dentistry.

Thursday, 15—

Last day for submission by graduate students of theses.

Last day of lectures for students in Agriculture, Arts, Commerce, Household Economics, Education, Engineering, Medical Laboratory Science, Nursing, Pharmacy, Physical Education, Rehabilitation Medicine, and Science.

Friday, 16—

Good Friday; University buildings closed.

Monday, 19—

Final examinations begin for students in the School of Nursing except first year B.Sc.

Tuesday, 20—

Final examinations begin for students mentioned under April 15.

Saturday, 24—

Last day of lectures in Law.

Monday, 26—

Final examinations begin in Law.

Tuesday, 27—

Survey School begins for first year Engineers.

Friday, 30—

Last day for registration of students in the Summer Session.

Last day for oral examinations for Masters and Doctoral candidates.

May—

Monday, 3—
Field experience begins for students in the School of Nursing except first year B.Sc.

Tuesday, 4—
Outdoor School begins for second year B.P.E. students.

Saturday, 8—
Last day of lectures in Medicine, the School of Dental Hygiene, and first, second and third years of Dentistry. Clinical period ends in fourth year Dentistry.

Sunday, 9—
Charter Day.

Monday, 10—
Final examinations begin in Dentistry and Medicine and in the School of Dental Hygiene.
Four months period of Hospital Practice for students in School of Rehabilitiation Medicine begins.

Wednesday, 12—
Notice of intention to be absent from Convocation must be given by 12:00 noon.

Friday, 14—
Last day for receiving applications for admission to Dentistry.

Sunday, 16—
Outdoor School ends for second year B.P.E. students.

Monday, 17—
Field Training Program begins for first year Dental Auxiliary students.

Thursday, 20—
Survey School ends.

Wednesday, 26—
Spring Convocation for U.A.C.

Friday, 28—
Convocation (Part I) for the conferring of degrees and diplomas in Agriculture, Arts, Commerce, Education, Engineering, Graduate Studies, Household Economics, Law, Physical Education and Science.

June—

Wednesday, 2—
Convocation (Part II) for the conferring of degrees and diplomas in Dentistry, Dental Hygiene, Medicine, Medical Laboratory Science, Nursing, Pharmacy, and Rehabilitation Medicine.

Friday, 5—
Last day for payment of 1965 Summer Session fees without penalty.

Wednesday, 30—
Fifty-eighth University year ends.

---

*Students will not be granted permission to leave the campus for extra-curricular activities during test weeks.

II—PROGRAMS OF STUDY

Faculty or School	Degree or Diploma	Years required (after senior matriculation unless otherwise shown) to complete course
Agriculture	B.Sc.	4
Arts	B.A.	3
	B.A. Honors	4
	B.F.A.	4
	B.Mus.	3
Commerce	B.Com.	4
Dentistry	D.D.S.	4 (after pre-dental year)
Dental Hygiene	Dental Auxiliary or Dental Hygiene	2
Divinity (Committee on the Degree of Bachelor of Divinity)	B.D.	see Arts and Science Calendar
Education	B.Ed.	4
	B.Ed. in Industrial Arts	4 (first 3 given only at U.A.C.)
	B.Ed. in Vocational Education	3 after Journeyman's Certificate
	Diploma in Education	see Education Calendar
Engineering (Civil, Chemical, Electrical, Mechanical, Metallurgical, Mining, Engineering Physics)	B.Sc.	4
Graduate Studies	M.A., M.Ed., M.Sc., Ph.D., Ed.D.	see Graduate Studies Calendar
Household Economics	B.Sc.	3
Law	LL.B.	3 (after B.A.)
(with Arts)	B.A., LL.B.	5
Medicine	M.D.	(4 after 2 yrs. pre-med.)
	B.Sc.	1 (see Medicine Calendar)

Faculty or School	Degree or Diploma	Years required (after senior matriculation unless otherwise shown) to complete course
Medicine (cont'd)	B.Sc. in Medical Laboratory Science	4
Nursing	B.Sc.	5
	Diploma in Public Health	1 (after Hospital Graduation)
	Diploma in Teaching and Supervision	1 (after Hospital Graduation)
Physical Education	B.P.E.	3
	B.A. in Recreation Leadership	4
Rehabilitation Medicine	Diploma in Physical Therapy	3
	Diploma in Occupational Therapy	3
Pharmacy	B.Sc.	3
	B.Sc. Honors or B.Sc. with Major	4
Science	B.Sc.	3
	B.Sc. Honors	4

EVENING CREDIT PROGRAM

Through its Evening Credit Program, the University offers credit courses at various centres in the evening and on Saturdays for the convenience of persons employed during the day. In 1963-64 courses were offered at the following centres in Northern Alberta; Edmonton, Camrose, Evansburg, Grande Prairie, Holden, Radway, Red Deer, Vegreville, and Wetaskiwin; and at Calgary, Bow Island, Lethbridge, Medicine Hat and Vulcan in Southern Alberta. Separate Evening Credit Program Calendars for Northern and Southern Alberta are published and can be obtained from the Office of the Registrar at Edmonton and Calgary respectively.

SUMMER SESSION

The University conducts Summer Sessions at Edmonton and Calgary. Established primarily to meet the needs of teachers, Summer Sessions provide a variety of courses for the convenience of candidates for various degrees who are unable to attend the regular sessions. Separate calendars for the Summer Sessions at Edmonton and Calgary are published and are available from the Registrar's Office at these centres.

III—ADMISSION (REQUIREMENTS)

FACULTY OR SCHOOL	PROGRAM	SUBJECTS OF ALBERTA GRADE XII (Senior Matriculation) REQUIRED FOR ADMISSION (with average of at least 60.0%)								REMARKS
		English 30	Social Studies 30	Maths. 30	Maths. 31*	Chem. 30	Phys. 30	Biol. 30 (or 32)	French 30 German 30 Latin 30	
Arts	B.A. B.A., LL.B. B.Mus. B.F.A.	C C C C	C C C C	C C C C		O O O O	O O O O	O O O O	C ‡O C ‡O C ‡O C ‡O	4 compulsory: 2 options. Either two sciences or two languages are required. For B.Mus. matriculants must also have completed Western Board of Music Grade VIII practical and Grades IV and V theoretical examinations.
Science	B.Sc.	C	C	C	†	O	O	O	‡C	4 compulsory: 2 options. †Mathematics 31 is also compulsory for certain Honors programs and recommended for certain General programs. For details see Science Calendar.
	Pre-Dentistry	C	C	C		C	C		‡C	6 compulsory.
Agriculture	B.Sc.	C	C	C		O	O	O	‡O	3 compulsory: 3 options. Admission will also be granted on basis of Diploma from Provincial School of Agriculture provided applicant possesses certain Grade XI and XII credits. For details see Agriculture calendar.
Commerce	B.Com.	C	C	C		O	O	O	‡O	3 compulsory: 3 options.
Dental Hygiene	Dental Auxiliary or Hygiene Diploma	C	C	O		C	O	O	‡O O O	3 compulsory: 3 options (Biology 30 recommended).
Dentistry	D.D.S.	C	C	C		C	C		‡C	The foregoing plus completion of the Pre-dental yr. req'd for adm.
Education	B.Ed.	C	C	O	O	O	O	O	‡O O O	2 compulsory: 4 options (Math. 31 acceptable as option, only if credit obtained by Departmental exam in June '62 or after. Music 30 is also acceptable option). Special requirements for admission to certain "majors" are given in the Faculty section of the Education Calendar.
	B.Ed. in Vocational Education	C	C	O	O	O	O	O	‡O O O	2 compulsory: 4 options; Journeyman's certificate or equivalent also required.
Engineering	B.Sc.	C	C	C	C	C	C			6 compulsory. Students presenting Chem. 30 without approved lab will have to satisfy Dept. of Chem. as to their proficiency in lab.

Household Economics	B.Sc.	C	C	C		C	O	O	‡C	5 compulsory: 1 option (Physics is recommended).
Law	LL.B.									Either a B.A. (or equivalent degree) or completion of the first two years of the B.A., LL.B. program is required for admission to Law.
Medicine	M.D.									Satisfactory completion of at least 2 years of university work after senior matriculation including full courses in inorganic chem., organic chem., physics and zoology is required for admission.
	B.Sc. in Medical Lab. Science	C	C	C		C	O	O	‡O	4 compulsory: 2 options. An average of at least 65% is required. Biology 32 not accepted after 1965.
Nursing	B.Sc. or Dipl. in Public Health or Teaching & Supervision	C	C	O		C	O	O	‡O	3 compulsory: 3 options. Biology 32 not accepted after 1965. Beginning in 1966 Biology 30 will be compulsory.
Pharmacy	B.Sc.	C	C	C		C	O	O	‡O	4 compulsory: 2 options (Physics is recommended).
Physical Education	B.A. in Recreation Leadership	C	C	O	O	O	O	O	‡O O O	2 compulsory: 4 options. (Math. 31 acceptable as option, only if credit obtained by Departmental Exam in June '62 or after. Music 30 is also acceptable option.)
	B.P.E.	C	C	O		C	O	O	‡O O O	3 compulsory: 3 options (Biology 30 recommended).
Rehabilitation Medicine	Dip. in Physical Therapy Dip. in Occupational Therapy	C	C	C	O	C	O	O	‡O	4 compulsory: 2 options (one of Physics 30 or Biology 30 (or 32) and one of Math. 31 or French 30 or German 30 or Latin 30). **Effective September 1966 Biology 30 will become compulsory and Chemistry 30 will be optional to Physics 30.**

NOTES: (1) In above columns "C" denotes a compulsory subject, "O" an option. The minimum acceptable mark is 50%, the average 60%.
(2) An Alberta High School Diploma is normally required.
(3) A student from another Province in Canada who has obtained clear senior matriculation for the University or Universities of that Province will be admitted to the University of Alberta with clear matriculation subject to the requirements for the first year courses in each program. Students who do not have clear matriculation on this basis will be required to complete full Alberta matriculation of the Faculty to which admission is sought.
(4) Further details may be found in the faculty sections of the calendar.
*Mathematics 31 mark not counted in computing required average unless departmental examination was written in 1962 or subsequently.
‡When Ukrainian 30 becomes a Departmental examination subject, it will be accepted as a matriculation language in the programs indicated above. Other languages at an equivalent level may also be accepted.

These general regulations notwithstanding, the University may in its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements of the University.

III—ADMISSION (PROCEDURES)

The courses of study in the University are, unless otherwise specified, open to men and women on equal terms.

Enrolment in any faculty or school must necessarily be limited to the number of students who can be accommodated. Students are normally accepted in the order of their academic standing from among the whole list of applicants.

APPLICATIONS AND TRANSCRIPTS

Prospective students who have not previously attended the University of Alberta must secure and complete Application for Admission forms and must submit them to the appropriate office **by the prescribed deadline.** Graduate students should obtain forms from the Dean of Graduate Studies. Alberta Grade XII students may obtain application forms and transcript order cards from the Principal or Counsellor of their high school. Other prospective applicants for admission to undergraduate programs may obtain forms from the Registrar of the University either at Edmonton or Calgary.

Since the deadline for receipt of applications for admission to most undergraduate programs is August 4, applicants should complete and return their applications before that date and should not wait to receive the results of supplemental examinations before applying (see deadlines below.) *Applications received after the deadline will be subject to a penalty fee of $10.00 for the first day, plus $1.00 for each subsequent day, up to a maximum of $25.00.*

In addition, every applicant should arrange, **prior to the deadline,** for the Registrar of the University (or the Dean of Graduate Studies if he is applying for entrance to that Faculty) to receive an **official transcript** of his high school education (and **two** transcripts of any courses taken at another university or college), **to be sent direct from the Department of Education or other institution maintaining such records.** Alberta applicants should apply to the Examinations Branch **before August 1,** to have a transcript of their high school record, including the June Departmental Examinations, sent to the University as soon as the results of these examinations become available.

RESTRICTIONS

Any applicant, who, after the June examinations, has deficiencies due to failures that would require him to write more than two Departmental Examinations in August to meet the admission requirements, will not be considered for admission in that same year. Moreover, any applicant who has had to write what the University considers to be an inordinate number of examinations because of failures and low marks, in order to attain the nominal entrance requirements of the University, may be refused admission on the ground that his chances for success at the University level are remote.

DEADLINES

Applications for admission to M.D. program	April 1
Applications for admission to D.D.S. program	May 15
Applications for admission to other undergraduate programs	August 4
Applications for admission to Graduate Studies	August 30

VISE FEE

A fee of $5.00 is charged for the evaluation of educational documents issued in Canada but outside Alberta; the fee is $10.00 for documents issued in other countries. Students entering the Faculty of Graduate Studies are exempt from visé fees.

MEDICAL EXAMINATION

Every applicant for admission must have a medical examination and arrange for the results of the examination to be reported to the University, before his application will be regarded as complete. A medical examination report form will be supplied to each prospective applicant with his application form.

The applicant should present the medical report form to his own physician when he appears for his examination. This should be done early in August since all medical reports should be in the hands of the Director, Student Health Services, before August 15 to ensure adequate time for review.

Special arrangements exist in the School of Nursing.

ADVANCED STANDING

Students from other universities may be admitted to advanced standing except in the combined courses. Extramural credits from recognized universities may be accepted under certain conditions, but such credits will not be considered beyond the first year of university work. Students who have taken the equivalent of university courses in some other manner may be given advanced placement (i.e. excused from taking such courses) but will not necessarily be granted advanced standing in them. They may be required to substitute other courses in order to complete a program of normal weight at this university.

All applications for such admissions should be addressed to the Registrar well in advance of the beginning of the session. Each application will be dealt with on its merits. The university reserves the right to require applicants for advanced standing or advanced placement to write examinations at any level including that of matriculation.

The amount of advanced standing that may be granted is limited by the residence requirements of the University of Alberta, which provide that a student proceeding towards a first degree will normally be required to attend at least one academic year as a full-time student.

CLASSIFICATION OF STUDENTS

Students are classifed as graduates, undergraduates (full-time or part-time), specials, and auditors.

Graduate Students are admitted to the Faculty of Graduate Studies in one of the following categories:

1. *Candidate for a master's degree.*
2. *Provisional candidate for a doctor's degree*:
   All Ph.D. and Ed.D. students are classified as provisional candidates until they have passed their Candidacy Examinations.
3. *Probationary graduate student* is one whose university record is either: (a) difficult to assess (e.g. some foreign students) or (b) below the standard normally required.

4. *Conditional graduate student* is one who is required to take undergraduate courses prerequisite to, and in addition to, the graduate program. Fees for such courses are not included in graduate program fees.
5. *Special graduate student* is one who wishes to take graduate courses for purposes other than degree credit at this university.

Undergraduate Students are those who possess full senior matriculation and who are taking one or more courses for credit towards an undergraduate degree. These students fall into two categories:

(a) *Full-time students*—i.e. those who are registered in two-thirds or more of a full year's work.

(b) *Part-time students*—i.e. those who are registered in less than two-thirds of a full year's work.

Extramural Students are those who are permitted to take a course without attending lectures. This privilege is sometimes granted to graduate students, B.Ed. candidates who possess a previous degree, and other students who have failed in one course in their graduating year and who are permitted to repeat the course without attendance.

Special Students are those who, although registered in one or more courses, are currently neither seeking credit towards a degree or diploma, nor entrance into a graduate program.

Auditors are students who have been granted official permission to attend lectures in a course on the understanding that they may not participate in class discussions, assignments or examinations. The audit privilege is restricted to a student who is currently registered in a degree or a diploma program, and who presents to the Registrar written permission from the instructor in the course, endorsed by the student's Dean or Director, to register in the course as an Auditor.

THE FACULTY OF GRADUATE STUDIES

The Faculty of Graduate Studies administers programs leading to the degrees of Master of Arts, Master of Education, Master of Science, Doctor of Philosophy, and Doctor of Education, and makes recommendations for granting the degrees of Doctor of Science and Doctor of Letters. Graduates who take courses in the University but are not at the time candidates for a degree are also enrolled in the faculty as "special graduate students".

Full details of regulations and programs of study will be found in the section of the calendar relating to the Faculty of Graduate Studies.

IV—REGISTRATION AND FEES

REGISTRATION PROCEDURE

Students should consult the Academic Schedule at the front of this calendar for registration dates. Further necessary details will be supplied prior to registration.

Students are required to register for courses in which they are deficient before registering for other courses. The faculty councils reserve the right to adjust courses to meet the requirements of time-tables of lectures and

examinations. The program of work for which a student seeks registration is in every case subject to the approval of the Registrar and the faculty concerned.

Graduate students carrying on full-time research or other academic work during the summer months may receive residence credit by registering with the Faculty of Graduate Studies for the whole, or a portion, of the period extending from the end of one regular winter session to the beginning of the next: this period is known as the Intersession. Application for such registration should be made as soon as the applicant's plans for this period are final.

N.B.—A student is responsible for the completeness and accuracy of his registration. He is also responsible for any adjustments of registration made necessary by the results of supplemental examinations. Particular care should be exercised with regard to prerequisite courses. Registration in courses which directly conflict on the timetable will be allowed only when the permission of the Faculty Council concerned has been secured.

LATE REGISTRATION

Students are normally required to complete their registration, in person, by the date specified in the academic schedule. After the end of the registration period, registration will be permitted only in exceptional circumstances and with the payment of a penalty fee of $3.00 plus $1.00 per day. Where possible, application for late registration should be made to the Registrar in advance of the normal registration period.

CHANGES IN REGISTRATION

A student may not abandon a course or change from one course to another without first obtaining permission from his Dean or Director. This permission in the form of a "Change of Registration" slip, signed by the Dean or Director must be presented to the Registrar before the change becomes official. Changes in registration will not normally be approved after the deadline appearing in the Academic Schedule.

CANCELLATION OF REGISTRATION

A student who wishes to withdraw from the University should report at once to the Student Counselling Services in order to complete Notice of Withdrawal forms which must then be submitted to his Dean or Director for approval. A student who withdraws without completing such forms will not be eligible for any refund of fees, nor for exemption from fees in the event that he has not paid them.

FEES

(Make all cheques payable **at par** to **University of Alberta.**)

The University reserves to itself the right to change these fees from year to year without notice.

Registration is incomplete until fees have been paid and is subject to cancellation unless payment has been made by the final date according to the regulations as stated in the section, "Payment of Fees".

When a student withdraws with the approval of his Dean an adjustment will be made on a pro rata basis except that no refunds will be made where withdrawal or cancellation is subsequent to March 15. In the case of a full-time

undergraduate student an administrative charge of $10 will be made. In any other case the administrative charge will be the amount of the registration fee.

The following special fees are applicable to all faculties and will be assessed in particular cases as they apply:

For viséing certificates (Not applicable in Graduate Studies.)	
Canadian	$ 5.00
Others	10.00
For transcript of record	1.00
For supplemental examinations, each subject	10.00
For special supplemental examinations, each subject	15.00
Late registration	$3.00+$1.00 per day

UNDERGRADUATE PROGRAMS

I—Full-time Students

General Fees

	Edmonton	Calgary
Students' Union:		
General	$12.50	$15.50
Building Fund	15.00	17.00
University Athletic Board	7.00	12.00
	$34.50	$44.50

Students will be assessed for extraordinary damage to furniture, apparatus, books, etc. Invoices will be submitted when necessary and must be paid before credit will be given for examinations.

Instruction Fees

Faculty of Arts:	
(a) B.A.:	
Per session*	$300.00
(b) B.Mus.:	
Per session	300.00
(c) B.F.A. or Diploma in Art:	
Per session	300.00
Faculty of Science:	
B.Sc.:	
Per session*	350.00
Faculty of Agriculture:	
Per session	350.00
Faculty of Commerce:	
Per session	350.00

*A student who transfers from a B.A. to a B.Sc. program in either the second or third year will be subject to a fee adjustment of the difference between the amount actually paid and the amount which would have been assessed had he registered initially in the B.Sc. program.

School of Dental Hygiene:
Dental Auxiliary or Dental Hygiene per session $350.00

Faculty of Dentistry:

(a) Pre-dental course (Science):
Per session 350.00

(b) Faculty of Dentistry:
Per session 500.00

Faculty of Education:
Per session 300.00

Faculty of Engineering:
Per session 400.00

School of Household Economics:
Per session 350.00

Faculty of Law:

(a) Arts and Law:
Per session, first and second years 300.00

(b) Law:
Per session 350.00

Faculty of Medicine:

(a) M.D.:
Per session, first year 500.00
Per session, subsequent years 550.00

(b) B.Sc. in Medical Laboratory Science:
Per session 350.00

(c) B.Sc. in Medicine:
Per session 350.00

School of Nursing:

(a) Degree course:
Per session, first year 350.00
Per session, second year 40.00
Per session, third and fourth years ..... Gratis
Per session, final 350.00

(b) Diploma course (Public Health or Teaching and Supervision) 350.00
For General Fees, see the Nursing Calendar.

Faculty of Pharmacy:
Per session 350.00

Faculty of Physical Education:
Per session 300.00

School of Rehabilitation Medicine:
Per session 300.00

II—Part-time Students

General Fees

	1 Course		2 Courses		3 Courses	
	Edmonton	Calgary	Edmonton	Calgary	Edmonton	Calgary
Registration	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 2.00
Student Health Service*	.....	.....	.....	.....	12.00	12.00
Students' Union	.....	.....	9.00	9.00	27.50	32.50
University Athletic Board**	7.00	12.00	7.00	12.00	7.00	12.00

*Optional at registration only (not available for students taking less than 3 courses).

**Optional at registration.

Instruction Fees

	Full Course	Half Course
Agriculture	$80.00	$40.00
Arts	80.00	40.00
Education	80.00	40.00
Commerce	80.00	40.00
Household Economics	80.00	40.00
Science	80.00	40.00
Auditor	12.00	6.00

In all other schools and faculties the fee assessment will be based upon the proportion the hours of instruction in the courses taken bear to the total number of hours of instruction in a normal year's work in the faculty concerned. For the purpose of assessment of fees, students who are taking two-thirds or more of a full year's work will be treated as full time students. In no case will the total fees assessed any special or partial student exceed the total fee for a normal year's work, nor will minimum assessment for tuition for one full course be less than $80.00.

GRADUATE PROGRAMS

Faculty of Graduate Studies:

General Fees

	Edmonton	Calgary
Registration	$10.00	$10.00
Graduate Students' Association	2.00	6.00
Students' Union:		
Associate Membership	5.00	6.00
or		
Full Membership (optional at registration only)	27.50	32.50
University Athletic Board (optional at registration only)	7.00	12.00

Instruction Fees

Full-time Students

Except where otherwise noted, each fee quoted in the following schedule is the current total instruction fee for the minimum period during which it is possible to complete the degree program. The University reserves the right to change fees without notice. Students who have not completed their programs when a change is made will pay at the new rate for the balance of their programs.

D.Sc. or D.Litt. degree	$325.00
Ph.D. or Ed.D. degree (Holders of Master's degree continuing in the same field) $325.00 a year for two years	650.00
Ph.D. or Ed.D. degree (Holders of Bachelor's degree with honors) $325.00 a year for three years	975.00
Masters degrees (Holders of Bachelor's degree with honors or of the B.Sc. degree from a four-year undergraduate program) One year at	325.00
Masters degrees (Holders of any Bachelor's degree from a three-year undergraduate program) $325.00 a year for two years	650.00
Master of Education degree, one year at $325.00 and one at $165.00	490.00
Master of Education degrees for which residence credit is obtained at Summer Session, three sessions at $165.00 (Application only to students on program before September 1963)	495.00
Subsequent years for all doctoral and masters candidates	40.00

Special and provisional graduate students taking courses other than those credited toward a degree program will be assessed $80.00 per full course and $40.00 per half course to a maximum of the fee for a full year's program of senior work in the appropriate faculty.

Part-time Students

Part-time students in all categories will be assessed $80.00 per full course and $40.00 per half course up to the amount of the total instruction fee for the full program. Part-time students shall be subject to an extra assessment of $40.00 for each registration in excess of three. Any outstanding balance will be assessed in the students' final session.

Student Health Service, optional at registration for students taking 3 or more courses	$ 12.00

Committee on Degree of Bachelor of Divinity:

Registration	$ 5.00

For Summer Session fees, see Summer Session Calendar.

PAYMENT OF FEES

Fees are due and payable immediately after registration. Students at Edmonton may make payments direct to the Cashier in the Administration Building or by mail to the Bursar. During the registration period and up to October 15th, a special deposit box is provided in the lobby of the Administration Building for payment of fees by cheque. Students at Calgary will make payments at Calgary in accordance with such arrangements as are made by the

Business Officer. The fee card stub must be presented with payment or enclosed if payment is made by mail or through the deposit box. The fee card stub will be returned to the student along with a cash register receipt. All cheques should be payable at par to the University of Alberta.

If fees are to be paid from some form of students' assistance it is the responsibility of the student to so advise the Cashier and (except in the case of Province of Alberta assistance) to produce a letter from the source of the assistance as confirmation. This must be done before the deadline for payment of fees to avoid the penalty. If the assistance is not forthcoming a late payment penalty will be assessed.

Regulations regarding payment of fees:

1. Undergraduate students:
   (a) Fees are due and payable immediately after registration. If desired, payment may be made in two instalments, in which case an additional charge of $3.00 will be added to the second instalment except in the Faculties of Medicine and Dentistry, where the charge will be $5.00. The first instalment consists of full General fees and approximately 60% of the Instruction Fee. (Instalment privileges are not available to students taking less than two full daytime courses.)
   (b) The last date for payment of fees is October 15th. If one is paying in two instalments the late date for payment of the first instalment is October 15th; the second instalment—January 15th. A penalty of $5.00 will be charged on any payments made or postmarked after these dates. In addition, if payment has not been made by October 31st for first-term fees and January 31st for second-term fees, registration will be subject to cancellation and the student to exclusion from classes. A re-assessment of fees will be made to the date of cancellation and the amount unpaid entered on the student's record. Future registrations will not be accepted until the account has been settled.
   (c) Where a student is permitted to register late, the last date for payment of fees will be fifteen days after the date of assessment. A penalty of $5.00 will be charged for any payment after this date.
2. Graduate students:
   The same regulations apply with the following changes:
   (a) The last date for payment of fees is fifteen days after the date of assessment, as shown on the fee card stub.
   (b) Instalment payment privileges are not normally available. However, arrangements can be made with the Fee Clerk in the Bursar's Office to pay in two instalments if the fees exceed $100.00.
3. Extramural students:
   (a) Registration will not be accepted unless accompanied by the registration fee of $2.00 ($8.00 for graduate students) which is not refundable. Full fees are payable on assessment and if not paid as at November 30, registration will be cancelled.
   (b) If notice of withdrawal is received by the Registrar by November 30, all fees except the registration fee will be refunded. If notice of withdrawal is received by the Registrar subsequent to November 30, a *pro rata* charge

from October 15 is made and the balance refunded except that no refunds will be made where withdrawal or cancellation is subsequent to March 15.

(c) A registration may not be carried over from one session to another session. If a student, for any reason other than illness, does not write his examination at the regular time, all fees are forfeited, and in order to be admitted to another examination in that course he must register in another session and pay the full fees. Deferred final examinations may be granted only on the basis of illness verified by a doctor's certificate and must be written at the time of the next regular University examination period.

EXAMINATION FEES

(a) *Final Examinations*: No fee is levied for final examinations written during regular examination periods.

(b) *Supplemental Examinations*: A fee of $10.00 is charged for each supplemental examination written during a regular supplemental examination period.

(c) *Deferred Final Examinations*: A fee of $5.00 is charged for each deferred final written during regular supplemental examination periods. The fee for special deferred finals requiring the setting of special papers is $10.00 per paper.

(d) *Special Supplemental Examinations*: For special supplemental examinations a fee of $15.00 is charged for each subject.

(e) *Outside Centres*: An additional fee of $5.00 per subject is charged for writing supplemental examinations in established Alberta centres other than Edmonton and Calgary.

V—GENERAL REGULATIONS

(a) ACADEMIC REGULATIONS

EXAMINATIONS

Term Examinations

(a) *First-Year Courses*: In first-year courses a definite mark for each student will be reported to the student's Dean at the close of the first term. This mark may be computed on the basis of one or more tests or essays or in any way that the instructor may consider satisfactory.

(b) *Senior Courses*: In senior courses the holding of term examinations is optional with the department concerned.

(c) *Distribution of Credits*: In each course where a final examination is held, credit of not less than 30% and not more than 70% will be assigned to term work. The remaining credit in each course will be assigned to the final examination. At the beginning of the session, announcement will be made by each instructor as to the procedure in each case and the distribution of credit.

(d) *Absence from term examinations or tests*: If a student has an unexcused absence from a term examination or test, the mark assigned to him will be zero. However, in case of illness the student may be excused from writing the examination or test. In applying for exemption a student must present to his instructor an absence slip signed by the Infirmary Physician. When

exemption is granted the percentage allotted to the examination or test missed is added to the percentage allotted to the final examination.

(e) *Test Weeks*: Although instructors may give tests at any time at their discretion, one week in the middle of the first term and one week between terms have been set aside as test weeks to assist in scheduling. During these weeks students will not be permitted to leave the campus to engage in extracurricular activities.

Final Examinations

(a) *Final Examinations*: With certain exceptions, a final examination is held in each course. In courses completed in the first term, final examinations may be held either during the test week in January *under departmental supervision*, or at the end of the session, at the discretion of the departments concerned. All other final examinations are held at the end of the session.

(b) *Absence from Final Examinations*: Any student who is ill or suffering from severe domestic affliction is advised not to sit for a final examination. Instead he should advise the Registrar at once of the circumstances and should apply for a deferred final examination to be written at the time of the regular supplementals. Similar action should be taken by any student, who, because of religious convictions or for other cogent reasons, is unable to write a final examination at the scheduled time. Such application will be referred to the student's Dean or Director for a final decision.

If a student becomes ill or receives word of domestic affliction during the course of an examination, he should report at once to the Supervisor, hand in his unfinished paper and request that it be cancelled. Thereafter, if illness is the cause, he must go directly to the Infirmary so that any subsequent application for a deferred examination may be supported by a medical certificate. The Registrar should be notified of the circumstances in writing within 48 hours of the examination.

In certain cases the decision may be to grant a deferred final examination which will carry with it no supplemental privilege in the event of failure.

Should a student write an examination, hand in his paper for marking, and later report extenuating circumstances to support his request for cancellation of his paper and for another examination, such request will not be entertained.

(c) *Debarment from Final Examination*: A student may be refused permission to write final examinations in a course, on the recommendation of the Department concerned and with the concurrence of the Dean of his Faculty, in the following circumstances:

(i) The student has an inordinate number of unexcused absences.

(ii) The student has neglected to do a substantial proportion of his written assignments in a course of which these are an essential feature.

(iii) The student has neglected to do a substantial portion of the laboratory work in a science course.

(d) *Reappraisal of Final Examination Papers*: Since great care is taken in marking of final examination papers, a student should apply for reappraisal of a paper only if he has good reason to believe that a mistake has been made. Reappraisals are dealt with by the head of the department in consultation with members of the staff. A request for reappraisal must be made by letter

to the Registrar within thirty days after the publication of results, accompanied by a fee of $10.00 for each paper; the fee will be refunded if the mark is raised from a failure to a pass, or from Class III to Class II, or from Class II to Class I, or by at least 5% within a passing grade.

The reappraisal privilege is limited to two papers. Normally there is no such privilege for supplemental examinations.

Students awaiting the outcome of a reappraisal should make application for supplemental examinations by the prescribed deadline.

(e) *Aegrotat Standing*: Aegrotat standing may be granted by the Faculty Council concerned to a student registered in either of the last two years of any course, unless it be in the final year for the first degree in a combined course.

Any student wishing to take advantage of this privilege should apply without delay to the Dean of the faculty concerned. Any other student absent from a final examination because of illness may apply for permission to write the regular supplemental examination (see paragraph (b), above).

(f) *Statement of Record*: After the end of each University session a statement of record is mailed to *each student at the home address specified on his registration.* This should not be expected before June 15.

Supplemental and Deferred Final Examinations

(a) *Supplemental Examinations*: Supplemental examinations are conducted by the University in September of each year (for exceptions, see following paragraph). A student granted the privilege of writing supplemental examinations must do so at the time of regular supplemental examinations next following or, if given special permission by the Dean, write the regular examinations next following. A student who has failed in a course in the preceding session and who has been granted a supplemental examination should apply to the Registrar not later than August 11, remitting the prescribed fee. Except under special circumstances, no student who has written final examinations will be permitted to sit for a supplemental examination unless he has attained an average of at least 50% on the year's work including the failed subject or subjects. In the faculties of Law, Medicine and Dentistry the average on the year's work must be at least 60%. Any student who returns to the University, having failed a supplemental examination or having neglected to write it, will be required to repeat the course. In certain cases an equivalent course may be prescribed instead of the failed course. The number of supplemental examinations allowed to any student is determined by the Faculty Council concerned. Notification of permission which may be granted to write one or more supplemental examinations is included in the statement of marks sent to all students.

Supplemental examinations for Medical and Dental students including those in the School of Dental Hygiene will be held in the latter part of August. Applications must be submitted to the Registrar at least twenty-one days before the examinations commence.

No application received after the deadline will be accepted.

(b) *Distribution of Credit*: The percentage of term marks carried forward to a supplemental examination will be determined by the Department and Faculty concerned.

(c) Graduating Students: In certain Faculties second-class standing is required in a specified number of subjects. In others an average of at least 60% is required in the last two years of the program. Regulations governing the writing of supplemental examinations to obtain such standing are laid down by these faculties and schools in their own calendars. Subsequent to the degree examinations a member of the graduating class who, having exhausted all the regular supplemental examination privileges, has still a failure in one course only, may, with permission of the faculty concerned, register in and repeat that course extramurally unless in the opinion of the department concerned a second attendance is necessary. A graduating student who is absent on account of illness from, or who fails in, a first term final examination may be allowed a supplemental examination at the end of the session; applications for such examination must be made not later than March 29.

(d) *Deferred Final Examinations*: A student who has missed a final examination because of illness or domestic affliction or who is obliged to absent himself from an examination for some other compelling reason (including religious convictions) may apply for a deferred final examination to be written at the time of the regular supplemental examinations (see section (b) under Final Examinations). A student in the Faculty of Medicine, Dentistry or Law who cannot take a first term final examination because of illness will be granted a deferred final examination at the end of the session. This regulation also applies to graduating students. (See section (c) above.) Application for such examination must be made not later than March 29 and must be supported by a satisfactory medical certificate.

(e) *Absence from Supplemental or Deferred Final Examination*: Special supplemental and special deferred final examinations may be granted to students who are prevented by illness (attested by a physican), domestic affliction or other extreme circumstances from writing at the regular time.

(f) *Special Supplemental and Special Deferred Final Examinations*: Special supplemental and special deferred final examinations may be written September 26. In certain approved cases they may be written during the regular examination periods in April, May or August. In each case, application must be made a full month before the examination is to be written.

EXAMINATION RESULTS

After the examination papers have been marked and the final results computed, they must be reviewed by the faculties and recorded in the permanent records before an individual statement can be sent to each student. As this process is time-consuming, students should not expect to receive their statements of marks until about June 15.

DEGREES IN ABSENTIA

Graduands who are unable to be present at Convocation are required to give notice in writing of their intention to be absent. This notice must be received by the Registrar by the date and hour indicated in the Academic Schedule. Any student who fails to give notice as required will be assessed a penalty of $10.00 prior to release of his or her parchment. A graduand may be excused from the payment of this fee if his absence without notice is due to sudden illness, accident, domestic affliction or other reason deemed valid by the Registrar.

GRADING SYSTEM

Students' marks are graded as follows: 80% and over, Class I; 65% to 79%, Class II; 50% to 64%, Class III. For students proceeding towards an undergraduate degree the pass mark is 50% unless otherwise specified; in courses taken toward a graduate degree the pass mark is 65%.

ACADEMIC HONORS

First-Class Standing

First-class standing in a given year is awarded to any student who secures an average mark of not less than 80% in the work of that year.

Degrees With Honors

A student in the Faculty of Arts or of Science with approved qualifications may proceed to the degree of Bachelor of Arts or Bachelor of Science with honors by following a more concentrated course of study in a special field under the supervision of one of the departments.

The time required for an honors degree is four years from senior matriculation. A student may apply for admission to an honors course at the beginning of either the first or second year, but formal admission to honors comes at the beginning of the second year.

Honors degrees are awarded in two classes, first-class honors and honors. For first-class honors, an average of 80% is required; for honors, 65%: In awarding honors, the entire university record of the student is considered.

Degrees With Distinction

The notation "With Distinction" is inscribed on the permanent record and graduation parchment of a candidate for any degree, except an Honors or Graduate degree, if the candidate has obtained a weighted average of 80% or higher over the last two years of his program.

A student who has taken part of his work at another university may be granted a degree "With Distinction" at the discretion of the Faculty concerned.

RESIDENCE REQUIREMENTS

1. A student proceeding towards a first degree normally must attend at least one academic year as a full-time student.

2. The final year of a degree program normally must be taken on the campus of the University of Alberta.

3. If the student has fulfilled the requirement outlined in (1) above before beginning the final year of his program, he may seek to fulfil the second requirement by attendance at Summer Session or in the Evening Credit Program of the University.

PROMOTION REGULATIONS

Full details of special promotion regulations of the various faculties and schools will be found in pages relating to the faculty or school.

UNSATISFACTORY STANDING

A freshman student whose matriculation record is weak may be warned of this fact at the outset of the session. A freshman student whose record in this first term is deemed unsatisfactory will be so notified by his Dean or Director. Appropriate steps will be taken to assist the student to improve his standing.

The records of all students in the University are reviewed at the end of each session. A student whose record is then unsatisfactory will be notified by his Dean or Director and will be referred to Student Counselling Services for recounselling. He may be denied supplemental examinations and may be required to repeat his year.

A student whose record is extremely unsatisfactory may be required to withdraw from the University and in any event will not be permitted to re-enter without re-counselling. Such a student who seeks re-admission to the University must report his intention by letter or in person to the Director, Student Counselling Services, not later than August 4th.

A student with an extremely unsatisfactory record at another University will not be considered for admission until at least a year has elapsed from the date of his leaving that institution. Thereafter, the procedure outlined above will apply.

The General Faculty Council may refuse permission to a student or prospective student to enter any year of any course if, in the opinion of the Council, the student shows a lack of general educational attainment. Further, a student whose record in the classroom, in tests, or in final examinations is unsatisfactory, may at any time be required to withdraw from the University.

RELATION OF SCHOLASTIC STANDING TO EXTRACURRICULAR ACTIVITIES

To be eligible (1) to represent the University in any competition with outside organizations, (2) to participate in non-competitive University activities which are open to the general public, or (3) to hold office in a student organization, a student must be a bona-fide student, and meet the requirements of *satisfactory scholastic standing.*

Bona-fide students are:

(i) students doing full-time undergraduate work in the University; or
(ii) graduate students in attendance carrying a full year's work leading to a degree; or
(iii) students in affiliated colleges carrying a full year's work leading to a diploma or certificate and taking two full courses of University grade in the University.

Bona-fide students may assume that they are scholastically eligible to participate in the activities listed above unless they are informed otherwise by their Deans or Directors. However, men students desiring to participate in events sponsored by the Western Canadian Intercollegiate Athletic Union, must meet the requirements of scholastic standing laid down by that body.

If a student feels at any time that there are circumstances which might have a bearing on his eligibilty to participate, he should consult the Dean of his faculty or the Director of his school as soon as possible and explain these circumstances to him.

APPEALS

A student may present an appeal to the respective Council or Administrative Committee concerned through the Dean or Director.

The General Faculty Council has power to hear and determine appeals from the decisions of the Faculty Councils upon application by members or by students

and others. Such appeals should be addressed to the Registrar, Secretary of the General Faculty Council.

(b) ATTENDANCE AND CONDUCT

ATTENDANCE

(a) Regular attendance is expected of students in all courses. Students having an inordinate number of unexcused absences from a course may be refused permission to take the final examination.

(b) Absences are counted from the first day of the session.

(c) Students who are late for any lecture or laboratory period will be marked absent unless at the end of the period in question they account satisfactorily to the instructor for their lateness.

(d) Illness and Physical Disability:

(1) Students who are absent from two or more consecutive classes in a course because of illness or disability should report the reason to their instructor upon their return to class.

(2) Absence from term or final examinations—see EXAMINATIONS.

(e) Students who are absent from two or more consecutive classes in a course for some valid reason other than illness should report to their instructor upon their return to class. If the instructor requires an absence slip, it will be the student's responsibility to have one signed by the Registrar and to show it to the instructor.

(f) Students desiring leave of absence in any given course must communicate their desire to the Registrar. At the end of such a period of absence, the student must present an absence slip for the Registrar's signature.

STUDENT CONDUCT AND DISCIPLINE

When a student enters the University, it is expected that he will apply himself to his studies and conduct himself with propriety. Should a student fail to live up to these expectations, the University reserves the right to take such action as, in its opinion, his case warrants. The penalty of expulsion may be applied.

1—Deans' Council

Although the Senate exercises jurisdiction in a general way over the conduct of students in attendance at the University, the actual day-by-day administration of student discipline has since 1942 been vested in the Deans' Council, and in those persons and bodies to which its authority has been delegated.

2—The Provost, the Dean of Women, and the Adviser to Men Students

The Provost of the University exercises general supervision over the conduct and welfare of the students. He is Secretary of the Deans' Council and Chairman of the Committee on Student Affairs, and of the General Residence Committee. He works in cooperation with the Dean of Women and the Adviser to Men Students.

3—The Disciplinary Committee of the Students' Union

The Students' Union is concerned with all matters of discipline and is, as a

matter of policy, given the first opportunity to deal with any disciplinary issue that may arise. For this purpose it has set up a Disciplinary Committee.

4—The Wardens and the General Residence Committee

The Residence Wardens are staff members appointed by the Board of Governors. In conjunction with the General Residence Committee, they are responsible for student discipline within the residences.

SPECIAL REGULATIONS OF THE BOARD OF GOVERNORS

(a) All interference on the part of any student with the personal liberty of another or any conduct on the part of any student subjecting another student to any indignity or personal violence is forbidden. No initiation ceremony involving physical violence, hazing, personal indignity, interference with personal liberty or destruction of property may be held within the buildings or on the grounds of the University, such student activities being expressly forbidden under penalty of suspension or expulsion.

The University authorities will not be responsible for any accident or illness of any kind occasioned to any student while engaged in or being subjected to any such activities.

(b) In the case of dishonesty or any serious indiscipline in the classroom, the instructor has the authority of suspension from the classroom. Further action is to be taken by a committee consisting of the Provost and the department and Dean concerned.

(c) The use of, bringing or having of liquor on University premises, including residences, is strictly prohibited.

(d) The Board of Governors considers the raiding or unlawful entry of residences as a very grave offence. Any such occurrence will be reported to and dealt with by the Board.

VI—STUDENT SERVICES AND STUDENT AFFAIRS

STUDENT COUNSELLING SERVICES

This is a counselling service staffed by professional trained counsellors for both university and prospective students. There is an office in Edmonton and in Calgary; and the counselling services in both centers operate throughout the year.

Prospective students may write or come in regarding choice of university program and vocational planning. Appointments should be arranged in the second term of the Grade XII year or during the following summer. The bulletin "Information for Prospective University Students" has been prepared to answer questions commonly asked.

University students may make use of the service regarding choice of program, vocational planning, personal matters and progress with studies.

(1) *Testing Service.* A few basic tests are given to all incoming freshmen at the time of registration. Vocational inventories and other individual tests are also available.

(2) *Study Skills.* A series of study tutorials is arranged each session for new students.

(3) *Vocational Planning.* Students may consult Student Counselling Services about future plans, including further possible professional training.

(4) *Student Housing Service.* See later page.

(5) *Financial Aid.* The counsellor in Calgary acts for the Administrator of Student Awards in all matters concerning financial aid.

(6) *Personal Problems.* Occasionally a student's performance suffers because of worry, restlessness, inability to concentrate, or preoccupation with personal problems. In these circumstances, the student should consult a counsellor as soon as possible.

(7) *Change of Faculty.* Students contemplating a change of School or Faculty are advised to consult a counsellor. This should preferably be done well before the opening of the session, as forms must be completed and submitted to the appropriate Dean or Director for approval.

(8) *Withdrawal from the University.* Any student who for any reason is contemplating withdrawal from the University should arrange an interview with a counsellor, and subsequently with his Dean or Director.

(9) *Unsatisfactory Standing.* Counselling is advised and, in the case of extremely poor standing, is required by the Faculty Council concerned. See UNSATISFACTORY STANDING.

Address enquiries to Student Counselling Services, University of Alberta, Edmonton (or Calgary). The Edmonton office is in the Education Building on the Campus; telephone 439-8721, Extension 772.

STUDENT HEALTH SERVICES

A Student Health Services budget is maintained in Edmonton by an annual appropriation from fee revenue. This budget is administered by a committee consisting of a Chairman from a University Faculty, the Medical Director, the Assistant Medical Director, the Student Health Service Physician, the Dean of the Faculty of Medicine, the Bursar, the Director of Student Counselling Services, the President of the Students' Union, the President of the Wauneita Society, the Treasurer of the Students' Union and the Chairman of one House Committee. All full-time students are entitled to medical treatment under such conditions and provisions as are outlined in the Student Health Service brochure which is supplied to all students. This brochure should be read carefully.

In Calgary, a committee administers a similar fund, which also is maintained by an annual appropriation from fee revenue.

PHYSICAL EDUCATION SERVICE PROGRAM

It is the aim of the Faculty of Physical Education to make a major contribution toward the physical, mental and social life of each student through instruction and participation in physical and recreational activities.

All first-year students are required to take two hours of physical education per week. Those excepted from this regulation are:

1. students declared physically unfit by the University Health Services:
2. students over 25 years of age.

Students in these categories must register with the Faculty of Physical Education.

Individual lockers, locks, towels and shower facilities are available for all students. The program is conducted in the Physical Education Building.

The prescribed gymnasium costume is:

Women:	*Men:*
Shorts (dark green)	Shorts
T-shirt (white)	T-shirt
Socks (white)	Socks (white)
Running shoes (white)	Running shoes

Shorts and T-shirts may be purchased at the University Bookstore.

NATIONAL EMPLOYMENT SERVICE STUDENT PLACEMENT

The National Employment Service Office on the main floor of the Administration Building at Edmonton is operated to help students find permanent or summer jobs. The Office is happy to advise or assist students at any time without obligation. Students who wish summer jobs are advised to register well before the end of the spring term. Those graduating should register at the beginning of the year because employer interviews begin in the early fall and continue throughout the session.

A similar office is located in the Arts and Education Building on the Calgary campus.

RESIDENCES

Residential accommodation is provided in the present University Residence Halls for approximately 1,500 students. Applications for reservations, accompanied by thirty dollars ($30.00), should be forwarded to the Housing Office, Lister Hall. Reservations will not be held after the respective dates of registration.

Students who make application for and are assigned rooms must understand that they are in fact agreeing to remain in residence for the full academic session.

Charges for Room and Board will be made at the following rates:

	Single Room	Double Room
Monthly charge	$90.00	$82.00
Daily rate (used for fractional periods)	3.05	2.80

Students leaving during the Christmas holidays will receive a rebate of $1.00 per day for board for each day's absence during the official vacation period. This amount will be credited to the respective room and board accounts.

Payment of room and board charges is due on or before the first day of each month. A penalty of 50c per day to a maximum of $5.00 per month will be assessed on any arrears after the tenth day of the month.

A limited amount of accommodation is available in St. Stephen's College and St. Joseph's College. Details can be secured by writing directly to the colleges.

The University reserves the right to change the above regulations, payment schedules and rates without notice.

STUDENT HOUSING SERVICE

While University authorities cannot accept responsibility for finding suitable accommodation they provide a special *listing* service for the benefit of out-of-town students. In Edmonton, *Student Housing Service* prepares lists of rooms prior to the summer session and to the regular session and these lists may be consulted by students looking for such accommodation. The service operates as a part of the Housing and Food Services and is located in Lister Hall. The housing phone is 433-1187. In Calgary, lists of rooms are available in the General Office.

Lister Hall provides a full meals and restaurant service for the convenience of students, and in addition the University Cafeteria and the Snack Bar in the Students' Union Building in Edmonton are open during hours adapted to their needs.

STUDENT AWARDS

The Administrator is Mr. R. B. Wishart. His office is on the second floor of the Administration Building in Edmonton, and his telephone number is 439-8721, Extension 495. He administers not only University awards but also those made under the Students Assistance Act. In Calgary, enquiries should be addressed to Dr. E. R. Oetting, Director, Student Counselling Services. For further information, see the Awards Section of the Calendar.

THE BOOKSTORE

For the convenience of students, the University maintains bookstores in Edmonton and in Calgary where textbooks prescribed in the university calendar may be obtained. Stationery, drawing materials, gymnasium wear and other accessories are also available at special student prices.

RAILWAY RATES

Students attending University are entitled to reduced fares and should apply to their local ticket agent for special student tickets. These tickets must be countersigned by the Bursar for the return journey at the end of the session.

STUDENT GOVERNMENT

A long-standing duty and prerogative of the University Senate has been to make provision for student self-government on the campus.

To this end it established a Committee on Student Affairs in 1911. A similar committee was formed for Calgary in 1950.

The Committee on Student Affairs ratifies the Constitution of the Students' Union and receives twice yearly reports on the Union's activities. All registered students become members of the Students' Union on payment of their general fees.

Besides authorizing the activities of the Students' Union, the Committee on Student Affairs interests itself in student extracurricular life in general.

In Edmonton students in residence elect members to a General Residence Committee with subcommittees for matters relating solely to the men and women students. Originally under the direct control of the Board of Governors, the General Residence Committee has since 1942 been a standing committee appointed by the Deans' Council.

THE INTRAMURAL SPORTS PROGRAM

The Faculty of Physical Education, with the cooperation of the University Athletic Board, organizes and administers a comprehensive program of intramural sports. A primary purpose of the program is to encourage sportsmanship and friendly relations among the students of the University through athletic competition. Individual and group competitive sports for men and women include tennis, golf, track and field, cross-country running, basketball, hockey, volleyball, touch football, table tennis, swimming and figure skating. Facilities include gymnasiums, swimming pool, ice arena and outdoor playing fields.

INTERCOLLEGIATE ATHLETICS

As a member of the Western Canada Intercollegiate Athletic Association, the University provides opportunities for men and women to compete in intercollegiate sports. Included in the activities for men are golf, tennis, cross-country, badminton, volleyball, basketball, football, hockey, wrestling, swimming and curling. Women compete in tennis, golf and badminton and hold two sports weekends with member universities. Basketball and curling are played during one weekend and volleyball, swimming and figure skating during the other.

UNIVERSITY NAVAL TRAINING DIVISION

The purpose of the University Naval Training Divisions is to select and train university students for commissioned rank in the Royal Canadian Naval Reserve.

Admission Requirements

(a) The candidate must be a Canadian citizen, or British subject resident in Canada with the status of a landed immigrant.

(b) He must be medically fit, possess the required officer-like qualifications and have a sound academic record.

(c) He must be 17 but not over 22 years of age prior to December 31 in the year of his enrolment in the UNTD.

(d) He must be registered in the first or second year of university work.

Method of Enrolment

Students should apply for enrolment in the UNTD during the first 2 weeks of registration. An information centre is located on the campus during certain days of the week of registration. An officer is in attendance to assist all interested students. In addition, students interested in a career as either a Permanent Force Naval Officer or an officer in the Royal Canadian Naval Reserve, may apply to the Department of Co-ordination and Placement for further information.

Selection Boards

Students who wish to join the UNTD as cadets on the Active List of the Royal Canadian Naval Reserve appear before a selection board in October, and during November are enrolled as Cadets in the Royal Canadian Naval Reserve.

Training Programme

(a) During the academic year the UNTD training programme consists of one training night a week commencing in late September. The training

is carried out through the media of lectures and instructional films and requires three winters to complete.

(b) During the summer Cadets must train a minimum of 17 weeks during their first two summers in ships and establishments of the Atlantic Command. The third summer training period is optional. Cadets may avail themselves of the opportunity to serve longer than 17 weeks each summer if they so desire.

Rates of Pay

(a) During winter training Cadets may receive up to 16 days' pay for attendance on training nights or a maximum of one hundred and twenty-five dollars ($125.00).

(b) During the summer training Cadets receive pay at the rate of $235.00 per month plus transportation and travelling expenses. In addition rations, quarters, and medical services are supplied.

General

(a) Cadets are issued with all required uniforms.

(b) When a Cadet has successfully completed three winters and two summers he will appear before a promotion board for his final assessment for commissioned rank. If he passes this board he will be promoted to sub-Lieutenant at the commencement of the next academic year.

Regular Officer Training Plan (ROTP)

Naval Cadets enrolled at the University under the Regular Officer Training Plan are students who have selected the Navy as a permanent career. These cadets take their winter training with UNTD Cadets and their summer training in ships of the Pacific Command. More detailed information on this plan can be had from:

RCN Recruiting Officer, 9947 - 109th Street, Edmonton, or the
UNTD Staff Officer, Armed Forces Building, University Campus,

or by writing to:

Area Recruiting Officer,
Room 436,
National Revenue Building,
150 Main Street, West,
HAMILTON, Ontario.

CANADIAN OFFICERS TRAINING CORPS (University of Alberta Contingent)

The COTC Programme

The purpose of the Canadian Officers Training Corps programme is to provide a means whereby university undergraduates can qualify for appointments in the Canadian Army Regular Force or Reserves, as a commissioned officer.

The training programme, which covers a minimum of two years, consists of two portions, a theoretical part taken at the university during the academic year and a practical part taken during the summer at a Canadian Army Regular establishment. The theoretical phases at the university consist of 64 periods of

instruction spread throughout the academic year. Candidates usually progress throughout three such phases in consecutive years. The practical portion taken during the summer at a school or unit of the Regular Army consists of 12 to 22 weeks of instruction with pay.

Qualification

Military qualification awarded as a result of theoretical and practical phase training is as follows:

Training Phase Completed	*Qualification*
one theoretical and one practical	Lieutenant Militia
two theoretical and two practical	Second Lieutenant Regular Force Lieutenant Militia
three theoretical and three practical	Lieutenant Regular Force Captain Militia

Eligibility

To enrol in the COTC a student must be:

(a) a Canadian citizen or British subject with landed immigration certificate (a student visa is not acceptable);
(b) physically fit and between the ages of 17 and 33;
(c) able to qualify as a second Lieutenant before graduation.

Some Corps of the Army will accept students from any faculty and up to the maximum age listed. In others there are certain limitations. For example the Corps of Royal Canadian Engineers and the Royal Canadian Electrical and Mechanical Engineers will only accept students registered in engineering. The Army Resident Staff Officer should be consulted for complete and current information.

Rank and Status

All candidates are enrolled as officer cadets. After successful completion of two theoretical and two practical phases of training officer cadets are commissioned in the rank of second lieutenant. On the completion of three theoretical and practical phases of training and attainment of a degree, second lieutenants are eligibile for immediate appointment to the Regular Army or Militia in the rank of lieutenant.

Pay

During the summer training periods COTC officer cadets and second lieutenants receive $235.00 pay each month and are provided with room and board, uniforms and medical care. First class transportation to the place of summer training and return is provided by the Department of National Defence.

During the winter training period, up to 16 days pay plus any additional amounts authorized may be earned.

Application and Enrolment

Students who are interested should apply as early as possible to the Commanding Officer of the COTC or the Army Resident Staff Officer located in the Armed Services Building, opposite the Varsity Rink. Applications for enrolment in the COTC are normally accepted up to January 15th.

ROYAL CANADIAN AIR FORCE (University Squadron)

Object

R.C.A.F. University Squadrons were formed at the major Canadian universities to promote a strong liaison and mutual understanding between the universities and the Royal Canadian Air Force. These squadrons will provide a flow of trained university graduates into the R.C.A.F. Regular or Reserve as commissioned officers.

Qualifications

Specific qualifications for enrolment in the University Reserve Training Plan are as follows:

(a) Age. A male applicant must have reached his 16th but not his 26th birthday on date of application. A woman applicant must reach her 18th birthday prior to commencement of her first period of summer training. Applicants under 18 years of age must produce the written consent of a parent or guardian.

(b) Medical category as established by the R.C.A.F.

(c) Marital Status. A male applicant may be married or single. A woman applicant must be single.

(d) Citizenship. An applicant must be a Canadian citizen, or a British subject permanently resident in Canada with the status of "landed immigrant".

Note: British subjects resident in Canada on a "student" or other visa are not eligible for enrolment.

Application

Application forms may be obtained at the Squadron Office. The selection of Officer Cadets for the University Squadron will commence at the beginning of the fall term, and terminate 31 January.

Training Program

The three year training program consists of formal training and supervised employment at R.C.A.F. schools and stations for a minimum of seventeen weeks and a maximum of twenty-two weeks each summer provided it can be completed during the period 15 April to 15 September. In addition, Officer Cadet and Pilot Officer members of the squadron attend weekly lectures and parades during each of the three winter terms preceding summer training.

Officer Development

During the first summer of training, all Officer Cadets undergo an initial Basic Officer Development Course at the R.C.A.F. Reserve Officers' School, in which they receive instruction in the duties, requirements and responsibilities of junior officers. This training involves the military, executive and development phases, which, besides the military and executive aspects of the R.C.A.F., are designed to train students as leaders who are well informed in world affairs and the role of Canada's defence forces in the current political and military situation, who are able to express themselves clearly and effectively, and who will make good officers and good citizens.

Formal Training

Most technical list and non-technical URTP Officer Cadets, on completion of the Basic Officer Development Course, proceed to R.C.A.F. schools to commence formal Air Force courses in their designated branches.

Winter Training Program

During the academic year, members of the University Squadron attend weekly lectures on orientation, executive and officer development subjects. The first winter's lectures are preparatory to entry into URTP and the Air Force. Lectures given during the second and third winters extend and amplify knowledge acquired during the officer development phases of summer training. Emphasis is placed on the integration of social and military sciences and the determination of their application to current affairs.

Officer Employment

Officer Cadets in those branches for which formal courses are not given during the summer months are employed in an "understudy" capacity at various units. This employment, which commences at the Officer Development Course, provides the students with experience in Air Force procedure and operation and allows them to observe the application of what they are taught at the Reserve Officers' School.

Status

Accepted university students are appointed in the R.C.A.F. Primary Reserve (University List) in the rank of Officer Cadet.

Officer Cadets have the status of subordinate officers for all purposes and wear the rank of Pilot Officer.

After successful completion of three summers of training and subsequent graduation from university, Pilot Officers may be appointed to the R.C.A.F. Regular, Auxiliary or Supplementary Reserve in the rank of Flying Officer.

Pay

Officer Cadets are paid at the rates prevailing for pilot officer. Net earnings for each summer employed vary between $850 and $1,200, depending on the length of duty. Winter pay is according to attendance at lectures and parades and amounts to approximately $100 if all sessions are attended.

Medical and dental care is provided during summer employment and first class rail transporation is issued on posting. Officer Cadets are issued with full kit of uniform for summer and winter wear upon acceptance.

For detailed information concerning Reserve University Squadron and R.C.A.F. (Regular), consult the Commanding Officer of the Squadron or the Resident Staff Officer (R.C.A.F.).

FINANCIAL ASSISTANCE

For the Regular Officer Training Plan and the Medical and Dental Corps Subsidization Plans, students are referred to the chapter on Academic Awards and Financial Assistance.

VII

The Faculty of Agriculture

INFORMATION, REGULATIONS, COURSES

INTRODUCTION

The Faculty of Agriculture was established at the University of Alberta in 1915 and the first students to receive the degree of Bachelor of Science in Agriculture (B.S.A.) graduated in 1918. The present B.Sc. degree was first given in 1924.

The four-year course in Agriculture provides education in the science of agriculture. The Faculty has under its direct administration the departments of Agricultural Economics and Farm Management, Agricultural Engineering, Animal Science, Dairy Science, Entomology, Plant Science and Soil Science. The Department of Genetics is jointly administered by the Faculties of Agriculture and Science. Many of the courses which are fundamental to the science of agriculture are given in other departments of the University, since the underlying scientific principles are the same as in any other field. It is the function of the departments in this Faculty to apply these principles to the solution of agricultural problems and to seek, through research, new information.

Graduates of the Faculty are engaged in teaching, research, extension, and administrative work related to agricultural production, marketing, and processing; in the manufacture and distribution of such essentials as feeds, fertilizers, and machinery; in the handling of agricultural products; and in farming. In recent years an increasing number of agricultural industries have offered attractive opportunities for graduates of this Faculty.

The departments in the Faculty also offer advanced degrees, and carry on extensive programs of research. The departments of Animal Science, Plant Science, and Soil Science operate experimental farms used in the teaching and research programs of these departments. All departments have space and facilities for laboratory research.

A modified first year in Agriculture may be taken at the University of Alberta in Calgary by registering in the program listed later in this calendar. A rather similar modified program is also offered at Lethbridge Junior College. The second, third and fourth years in Agriculture are offered at the University of Alberta in Edmonton only.

Two years of Pre-Veterinary Medicine may be taken at the University of Alberta with a view to applying for admission to the four year program in Veterinary Medicine at the University of Saskatchewan, Saskatoon which will accept students for the first time in September 1965. (See Special Program.)

Student Guidance

The Dean of the Faculty of Agriculture will be pleased to confer with students at any time.

Students of the second, third and fourth years will be assisted and guided in connection with their registrations by members of the Agricultural Registration Committee.

ADMISSION

Matriculation Requirements

Students from the high schools of Alberta seeking admission to the Faculty of Agriculture will be required to present either—

I.—The High School diploma with "B" or higher standing in the following courses and an average in them of at least 60.0%:

1. English 30.
2. Social Studies 30.
3. Mathematics 30.
4. 5. and 6. Three of: Biology 30*
   Chemistry 30**
   Physics 30
   French 30, or German 30, or Latin 30, or another language at an equivalent level.

or

II.—A diploma from a Provincial School of Agriculture, together with "B" or higher standing in Literature 20; Language 20; Social Studies 20; *one* of French 20, German 20, or Latin 20, or another language at equivalent level; Mathematics 30; and two of Biology 30 (or Biology 32*), Chemistry 30**, or Physics 30; with an average in the three Grade XII courses of at least 60.0%.

It is advantageous to have Mathematics 31 also.

Students who completed Grade XII in 1954 or earlier will be given full consideration for admission. They are advised to write to or to see the Registrar of the University and to provide a complete transcript of their high school records.

Candidates from outside Alberta will be required to meet equivalent standards.

These general regulations notwithstanding, the University may in its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

PROMOTION

1. Inasmuch as a rigid year system is not followed in the Faculty of Agriculture, promotion from year to year is made by Faculty Council upon the recommendation of the Agricultural Revisions Committee.
2. In general, promotion to the third year in Agriculture will be granted only to students who have passed all first and second year subjects required; exception may be granted when a student has passed all first and second year subjects but one and has an average standing for the two years of at least 60.0%.

---

*Biology 32 will be accepted until and including September, 1965, only. Students offering that course will be required to take Biology 130 in their first year.

**Chemistry 30 was previously required. Any student not offering this course will be required to take Chemistry 130 as well as Chemistry 230.

3. Students transferring from other universities normally will be required to take, as a minimum, the equivalent of a regular senior year in attendance at the University of Alberta before the degree of B.Sc. in Agriculture will be granted.

The attention of students in Agriculture is directed to the fact that admission to postgraduate studies leading to the M.Sc. or Ph.D. degrees is based primarily upon the quality of the undergraduate work.

PROGRAMS OF STUDY

The Degree of B.Sc. In Agriculture

In the Faculty of Agriculture, courses are offered leading to the degree of B.Sc. in Agriculture.

Most of the first year program in Agriculture consists of courses required of all students. There are also some courses required of all students during the second year but students may select some courses of their own choice. Thus students have the opportunity to commence specialization in one of several branches of professional agriculture, or they may continue on a general program of courses in the second year. During the third and fourth years students have great freedom in the selection of the courses which they take.

Requirements for the B.Sc. degree in Agriculture for general and specialist programs follow.

Courses Required in the First Year

(1) Agriculture 202 (2-0; 0-0)
(2) Agriculture 203 (0-0; 2-0)
(3) **Either** Biology 130 (for those lacking Biology 30)
Or an approved option.
(4) **Either** Chemistry 130 (for those lacking Chemistry 30)
Or Chemistry 230
(5) Economics 200
(6) English 210
(7) Mathematics 180 (or 201)
(8) If necessary an approved option to bring the course load to five full courses exclusive of Agriculture 202 and 203.

Courses Required in the First or Second Year

(1) One of the following: Entomology 301; Genetics 351; Microbiology 360; Entomology 300 and Genetics 360; Bacteriology 201 and Genetics 360.
(2) Two of: Chemistry 350; a mathematical subject: Physics 100 or 200; an approved social science; an approved biological science.
(3) A full course or equivalent in an agricultural department.
(4) An approved elective.
(5) Additional course(s) as necessary to give a minimum of ten full courses or equivalent in addition to Agriculture 202 and 203 during the first two years.

Modified First Year at the University of Alberta, Calgary

Subjects	First Term		Sec. Term	
	Lect.	Lab.	Lect.	Lab.
Botany 271	3	3	3	3
Chemistry 230 (or 130)	4	3	4	3
English 210 (or 240)	3	...	3	...
Economics 200 (or Mathematics 211)	3	...	3	...
Zoology 220	3	3	3	3
Physical Education 218 (or 228)	...	2	...	2

Note: At Lethbridge Junior College students should take Botany 201, Chemistry 230, English 210, Mathematics 200 or 301 (or Economcis 200) and Zoology 200.

Other Requirements

1. After successful completion of the requirements of the first and second years students must complete a minimum of ten full courses or equivalent in addition to Agriculture 451, which is required in the fourth year.
2. A mid-September field trip of approximately one week, that normally will be taken prior to registration for work of the third year and at the student's expense, is a requirement for graduation unless a student has been specifically exempted from this requirement. Details are provided to the students concerned in March or April each year.
3. Commencing in the second year students may follow a general program designed to provide a broad training in agriculture or they may begin specialization in one of several fields.
   (a) Students not following a program of specialization must take courses in at least six Faculty of Agriculture departments and they must take at least twelve half-courses in Agriculture departments. Programs of study must be approved by the Registration Committee.
   (b) Students following programs of specialization must meet a minimum of four Faculty of Agriculture departments in addition to the one in which they are specializing and they must take at least six half-courses in those departments. Programs of study must be approved by the Registration Committee and the department of specialization.
4. At least two Arts and Science courses in addition to those listed for the first and second years are to be taken. One of these courses must be a social science or humanity. (Students specializing in Agricultural Economics would meet this latter requirement by a course other than an Economics course.)
5. Normally, fourth year students having advance senior credit must register for a program of five full courses or equivalent including "extras". Students may, under advice, register for additional courses up to a maximum of six full courses or equivalent in any one year. This total may not be exceeded except by special permission of the Dean of the Faculty.

In order to exclude courses in excess of the minimum requirement from the contract for graduation, the student must designate such courses as "extras" at the time of registration for the final year.

6. **Changes in registration can be made only by arrangement with the Registration Committee before November 1 in the case of full-year or first-term courses, or before February 15 in the case of second-term courses.**

ACADEMIC STANDING REQUIRED FOR GRADUATION

1. After the requirements of the first two years have been met, students must obtain a passing mark or better in 10 full courses or equivalent and obtain an average of 60.0% in those courses.
2. A student will not be allowed to write more than the equivalent of three full course supplemental examinations whether for the purpose of obtaining passing marks or of raising his average to the required 60.0%.
3. A student will not be allowed to write more than the equivalent of two full course supplemental examinations in any year.
4. A student who is repeating a year will be granted no supplemental privileges in the courses taken that year and must pass all courses with a 60.0% average to be allowed to continue.
5. The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in this Faculty, unless by special permission of the Faculty of Agriculture Council.

Attention is directed to the regulation that a student is responsible for the completeness and accuracy of his registration.

Preferred Second Year Electives for Specialization in Various Departments

Agricultural Economics	Agricultural Engineering	Animal Science	Dairy Science
Ag.Ec. 303, 315 Ag.En. 240, Econ. 300 Ento. 300, Gen. 360 Stat. 305, an approved social science elective.	Ag. Eng. 240 Ag.Ec. 303	Micro. 201 and Genetics 360 or approved elective(s)	See Dairy Science

Entomology	Genetics	Plant Science	Soil Science
None Specified	Genetics 351 or Micro. 201 and Genetics 360	Micro. 201 and Genetics 360 or approved elective(s)	Micro. 360 Soil Sci. 240 and 250

Third and Fourth Years

The general requirements for the various programs of specialization are given in the following sections. Students entering the third year must consult the departments in which they plan to specialize and it is highly desirable to

work out a tentative program for both the third and fourth years. All programs of specialization must be approved by the Departments concerned and must be acceptable to the Registration Committee.

Students planning to follow the general program should consult the Registration Committee to obtain approval of the programs which they plan to follow.

Department of Agricultural Economics

Students wishing to specialize in Agricultural Economics should consult with the Head of the Department concerning their course programs. Special programs may be arranged for students interested in Agricultural Marketing, Farm and Ranch Management, Agricultural Business Management, and General Agricultural Economics. Course work may concentrate in data analysis, management, production economics, agricultural finance, land economics, marketing, prices, agricultural policy, or economic development.

Department of Agricultural Engineering

Agricultural Mechanization

Third and Fourth Years: An approved course in mathematics; one of Business 202, Business 300, Agricultural Economics 335 and 336; Agricultural Engineering 401; four of Agricultural Engineering 301, 302, 303, 304 and 305. Electives to a minimum of five full courses per year.

Department of Animal Science

The courses listed below, plus approved electives to a minimum of 5 full courses per year, are recommended for most students. Normally electives should include sequences of two half-courses in the agricultural engineering, soil and plant science areas. Those who desire more specialized programs or who anticipate proceeding to graduate study are urged to consult the head of the department to consider alternative program outlines; Biochemistry 300 and Biometrics 455 are strongly recommended for these students. Dairy Science 241, 466, 476 and one of 353 or 490 are required courses for a minor in Dairy Science.

Animal or Poultry Science

Third Year: Animal Science 300, 310, 370, Poultry Science 352, Veterinary Science 451, Farm Management 362.

Animal Science

Fourth Year: Animal Science 468, 469, 480, 482, Poultry Science 455.

Poultry Science

Fourth Year: Animal Science 468, Poultry Science 453, 455, 459, 460.

Department of Dairy Science

Four programs are offered in the Department. The courses recommended in these programs in the second year, in addition to the Faculty requirements, are given below:

Dairy Processing		Dairying		Food Science		Agr. and Food Microbiology	
Micro.	360	Micro.	360	Micro.	360	Micro.	360
Dairy Sci.	241	Dairy Sci.	241	Physics	200	Soil Sci.	430
Ag. Eng.	240*	Animal Sci.	370	Mathematics	304*	Physics	200*
Physics	200*	Genetics	351				

*or elective.

Students interested in any of the above four programs can obtain from the Department recommended lists of courses for each program. Any of these programs can be modified in consultation with the Head of the Department, to meet the needs of different students. The courses given for the second year are recommended as pre-requisites for later courses. The program in Dairying involves a minor in Animal Science consisting of a minimum of four half courses from the following paired half-courses:

An.Sc. 468 and An.Sc. 469 An.Sc. 480 and An.Sc. 482 An.Sc. 300 and An.Sc. 310

Department of Entomology

Third and Fourth Years: Students wishing to specialize in entomology should consult with the head of the department respecting their course programs. The department is active in behavior, ecology, morphology, physiology, taxonomy and toxicology of insects.

Department of Genetics

Third and Fourth Years: Students wishing to specialize in Genetics or in Field Crop and Plant Breeding should consult with the head of the department respecting their course programs. The department is active in cytology, cytogenetics, microbial genetics, biochemical genetics, biometrical genetics, radiation genetics, genetics of parasitism, field crops and plant breeding.

Department of Plant Science

The Department of Plant Science is composed of the following divisions:

Horticulture	Plant Physiology and Biochemistry
Plant Pathology	Weed Science

Students interested in a program in general plant science or in specialization in a particular field of study should consult with the head of the department or with staff members in charge of the various divisions.

For students majoring in plant physiology and biochemistry recommended courses include Plant Physiology and Biochemistry 431 and 432, Physics 240, Chemistry 312, Chemistry 370 and Botany 320.

Department of Soil Science

Soil chemistry, soil fertility, soil genesis and classification, soil microbiology, soil physics.

Third and Fourth Years: Soil Science 420, 430, 450, 460, 470 and either Biometrics 455 or Geology 202 plus electives to meet requirements for degree in specialized programs.

Consult the Department for a detailed listing of the courses in the other Agricultural Departments and in other Faculties acceptable as electives for specialization in Soil Science.

SPECIAL PROGRAM OF PRE-VETERINARY MEDICINE

Facilities at the Ontario Veterinary College are very limited, and because of the great current interest in veterinary medicine, few if any students from Alberta are likely to be admitted to that institution, with or without advanced standing.

A new College of Veterinary Medicine is being established at the University of Saskatchewan, Saskatoon. Tentative approval has been obtained authorizing that program to consist of two years of Pre-Veterinary Medicine and four years of Veterinary Medicine. Alberta residents hoping to take Veterinary Medicine at the University of Saskatchewan may take the two Pre-Veterinary years at the University of Alberta.

It is probable that there will be a quota on Alberta students entering Veterinary Medicine at the University of Saskatchewan and that those students with the highest standing in the work of the two Pre-Veterinary years will receive preference. In fact all students considering veterinary medicine should know that there is such keen competition for admission to schools of veterinary medicine that a superior academic record is likely to be a requirement to win one of the limited number of places available anywhere.

Admission

Students in the Pre-Veterinary Medicine Program are registered in the Faculty of Agriculture.

The admission requirements are:

The High School Diploma with "B" or higher standing in the following courses and an average in them of at least 60%.

1. Chemistry 30
2. English 30
3. French 30, German 30, or Latin 30
4. Mathematics 30
5. Social Studies 30
6. Biology 30 or Physics 30

Pre-Veterinary Medicine Program

First Year

Agriculture 202 (2-0; 0-0)*
Agriculture 203 (0-0; 2-0)*
Biology 130 or 230 (3-3; 3-3)
Chemistry 230 (4-3; 4-3)
English 210 (3-0; 3-0)
Mathematics 180 or 201 (4-0; 4-0)
Physics 100 (3-3; 3-3) or an elective
Physical Education (0-2; 0-2)

Second Year

Biology 230 (3-3; 3-3) or Zoology 300
Chemistry 350 (3-3; 3-3)
Economics 200 (3-0; 3-0)
Genetics 351 (3-3; 3-3)
Physics 200 (3-3; 3-3)

Note: Students successfully completing the two years of Pre-Veterinary Medicine may apply to transfer to the program in Agriculture with the opportunity to earn the B.Sc. in Agriculture by the successful completion of two additional years of work with satisfactory standing.

Correspondence regarding the Pre-Veterinary Medicine Program should be addressed to:

The Dean, Faculty of Agriculture
University of Alberta, Edmonton.

GRADUATE STUDIES

Programs leading to advanced degrees (M.Sc. and Ph.D.) are offered by the Departments of Agricultural Economics, Agricultural Engineering, Animal Science, Dairy Science, Entomology, Genetics, Plant Science, and Soil Science. Course programs and thesis projects are arranged in consultation with members of the departmental staffs.

General information concerning the Faculty of Graduate Studies and details concerning admission, fees, etc., are given in the special calendar for that Faculty. Information on requirements and opportunities in specific fields of work may be obtained from the appropriate department.

DETAILS OF COURSES

The courses offered by the Faculty of Agriculture are listed below.

Courses numbered 100 to 299 inclusive, described as junior, are open to first-year students and are also available as options in senior years of certain patterns. Courses numbered 300 to 499, described as senior, are designed primarily for students beyond the first year at University. Those numbered 500 or higher are open mainly to honors and graduate students. For further information, particularly in the matter of prerequisites, students are advised to consult the section of the calendar containing detailed descriptions of courses.

NOTE: The hours of instruction per week for both terms are shown at the top of each course description. The letter "L" attached to a figure signifies lecture-laboratory-hours, the letter "P", project-hours, and the letter "S" seminar-hours. Unless otherwise specified, the first figure in each term indicates lecture-hours and the second laboratory-hours.

---

*These are attendance courses which do not have examinations.

AGRICULTURE

Agric. 202. Introduction to Agriculture (2-0; 0-0)
An orientation course dealing with the development, role, scope, application, current thought and practices of the major areas of scientific agriculture.

Agric. 203. Public Speaking (0-0; 2-0)
A series of lectures on essentials and procedures in public speaking. The development of confidence before audiences by student participation in the preparation and presentation of short talks.

Agric. 451. Practical and Professional Agriculture (1-0; 1-0)
The present status of practical and professional agriculture. Agricultural organizations in the business and professional fields. Employment opportunities.

AGRICULTURAL ECONOMICS

STAFF:
Professor and Head—T. W. Manning
Professor—H. C. Love
Associate Professor—G. R. Winter
Assistant Professor—

Ag.Ec. 303. Introduction to Agricultural Economics—Staff (3-0; 0-0)
The economic organization of agriculture, economic aspects of production, marketing, finance, resource use, prices, and policy as applied to the farm firm.
Prerequisite: Econ. 200.

Ag.Ec. 315. Agricultural Economics Data and Analysis—G. R. Winter (0-0; 3-3)
Basic and secondary sources of economic data relating to agricultural production, processing, and marketing; their collection, analysis, and presentation.
Prerequisite: Stat. 305.

Ag.Ec. 362. Farm and Ranch Management—H. C. Love (3-3; 3-3)
The organization and management of farm business. Farm records, budgets, finance and credit, appraisal, job analysis and work simplification. Critical analysis of farm management research.
Prerequisite: Ag.Ec. 303 or Econ. 200.

Ag.Ec. 364. Agricultural Market Organization—T. W. Manning (3-3; 0-0)
The organization, functions, and agencies of agricultural markets. The laboratory will include field trips and case studies of marketing agencies and individual commodities.
Prerequisite: Ag.Ec. 303 or Econ. 200.

Ag.Ec. 385. Agricultural Prices—T. W. Manning (0-0; 3-3)
The process of price determination, market price discovery, futures prices, and price behavior over time. The laboratory will include special studies of commodity prices and exercises in statistical price analysis.
Prerequisite: Ag.Ec. 303 or 364(365).

NOTE: Economics 300 or consent of Department is prerequisite for the following courses.

Ag.Ec. 415. Analytical Methods in Agricultural Economics—G. R. Winter (3-3; 0-0)
Uses of mathematical models, probability theory and statistical inference in agricultural economics research and analysis.
Prerequisite: Ag.Ec. 315.

Ag.Ec. 422. Managerial Economics for Agricultural Businesses—G. R. Winter (3-0; 0-0)
The role of management in farm supply, service and distribution businesses. Economics of making managerial decisions.
Prerequisite: Ag.Ec. 364 (365).

Ag.Ec. 423. Management Techniques in Agriculture—G. R. Winter (0-0; 3-0)
The application of decision-making techniques to the management of agricultural businesses.
Prerequisite: Ag.Ec. 422 (440).

Ag.Ec. 443. Agricultural Finance—Staff (0-0; 3-0)
Capital requirements in agriculture, financial management; credit institutions.
Prerequisite: Ag.Ec. 303 or 362.

Ag.Ec. 453. Land Economics—Staff (3-0; 0-0)
Land and population, conservation, theory of rent; farm tenure and appraisal.
Prerequisite: Ag.Ec. 303 or 362.

Ag.Ec. 463. Agricultural Marketing Economics—T. W. Manning (3-0; 0-0)
Economic aspects of agricultural markets; location of market activity; market structure and performance.
Prerequisite: Ag.Ec. 364 (365).

Ag.Ec. 473. Agricultural Policy—T. W. Manning (0-0; 3-0)
Economic policy aspects of the production, marketing, and income problems of farmers.
Prerequisite: Ag.Ec. 303 or consent of Department.

Ag.Ec. 493. Agricultural Growth and Adjustment—Staff (0-0; 3-0)
Achieving optimum use of resources in agriculture under conditions of economic growth and technological change.
Prerequisite: Ag.Ec. 303 or consent of Department.

NOTE: The following courses are open only to graduate students, and to senior students with the consent of Department.

Ag.Ec. 500. Research Projects in Agricultural Economics—Staff (2-6P; 2-6P)
Investigations of special problems. Credit according to work done, with a maximum of six hours.

Ag.Ec. 516. Analytical Techniques—G. R. Winter (3-3; 0-0)
Applications of advanced mathematical and statistical techniques in the analysis of agricultural economics problems.
Prerequisite: Ag.Ec. 415 or consent of Department.

Ag.Ec. 533. Production Economics—H. C. Love (3-0; 0-0)
Production principles applied to resource use, static and dynamic firm theory, uncertainty and expectations.
Prerequisite: Ag.Ec. 362.

Ag.Ec. 553. Economics of Land Use and Conservation—Staff (3-0; 0-0)
Economic principles applied to conservation, exploitation, and development.
Prerequisite: Ag.Ec. 453.

Ag.Ec. 563. Market Structure—T. W. Manning (3-0; 0-0)
Analysis of market organization, structural elements and their relations to market behavior.
Prerequisite: Ag.Ec. 364 and consent of Department.

Ag.Ec. 583. Price Analysis—Staff (3-2; 0-0)
Economic and statistical analysis of agricultural price behavior.
Prerequisite: Ag.Ec. 315 and 385.

Ag.Ec. 601. Agricultural Economics Seminar—Staff (1S-0; 1S-0)

Ag.Ec. 613. Research Methods—G. R. Winter (0-0; 3-0)
Prerequisite: Ag.Ec. 516 or consent of Department.

Ag.Ec. 633. Resource Efficiency and Allocation—H. C. Love (0-0; 3-0)
Prerequisite: Ag.Ec. 533.

Ag.Ec. 663. Market Performance—T. W. Manning (0-0; 3-0)
Prerequisite: Ag.Ec. 563.

Ag.Ec. 673. Topics in Agricultural Economics—Staff (0-0; 3-0)
Prerequisite: Ag.Ec. 473.

AGRICULTURAL ENGINEERING

STAFF:
Professor and Head—F. V. MacHardy
Associate Professors—T. A. Preston, B. T. Stephanson

Ag.En. 240. An Introduction to Agricultural Mechanization (0-0; 3-3)
T. A. Preston
A study of agricultural machines and structures in relation to agricultural production. Layout analysis. Application of motion and time studies to the operation of agricultural equipment.

Ag.En. 301. Heating, Ventilating and Air Conditioning Agricultural Buildings—F. V. MacHardy (3-3; 0-0)
Environmental requirements as determined by physiological principles. Environmental control.
Textbook: Barre and Sammett, *Farm Structures.*

Ag.En. 302. Farm Structures—F. V. MacHardy (0-0; 3-3)
Structural design of agricultural buildings.
Textbook: Barre and Sammett, *Farm Structures.*

Ag.En. 303. Agricultural Power Units—B. T. Stephanson (3-3; 0-0)
Engineering principles as related to the selection of power units.
Textbook: Barger, Carleton, McKibben & Bainer, *Tractors and Their Power Units.*

Ag.En. 304. Agricultural Machines—B. T. Stephanson (0-0; 3-3)
Characteristics of the functional elements of farm machines. Methods of evaluating machine performance.
Textbook: Bainer, Kepner and Barger, *Principles of Farm Machinery.*

Ag.En. 305. Agricultural Materials Handling and Processing (3-3; 0-0)
B. T. Stephanson
Characteristics of fluid, free-flow and non free-flow materials, as related to storage, flow, elevation and transport. Principles of drying and refrigeration.
Textbook: Henderson and Perry, *Agricultural Process Engineering.*

Ag.En. 401. Quantitative Methods in Agricultural Mechanization—F. V. MacHardy (3-3; 3-3)
Application of quantitative methods to the solution of actual problems involving materials handling, equipment selection and production layout. The use of analog and digital computers in agricultural problem solving, control, and simulation.
Textbook: Sasieni, *Operations Research—Methods and Problems.*

Ag.En. 601. Operations Research—F. V. MacHardy (3-3; 3-3)
Application of statistical and mathematical techniques to selected problems in Agricultural Mechanization.

ANIMAL SCIENCE

Courses offered by the Department of Animal Science staff are arranged under the designations: Animal Science, Biometrics, Poultry Science and Veterinary Science.

STAFF

Professor and Head—L. W. McElroy
Professor, Animal Nutrition—J. P. Bowland
Professors, Poultry Nutrition—D. R. Clandinin, A. R. Robblee
Professor, Animal Genetics—R. T. Berg
Assistant Professor, Animal Genetics—W. Combs
Assistant Professor, Animal Nutrition—C. M. Grieve
Assistant Professor, Animal Physiology—T. D. Groves
Assistant Professor, Poultry Genetics—R. T. Hardin
Lecturer, Veterinary Science—J. G. O'Donoghue

An.Sc. 300. Introductory Animal Physiology—T. D. Groves (3-3; 0-0)
Physiology of the organs and organ systems with emphasis on domestic animals; supporting laboratory exercises in basic and applied physiological techniques.

Prerequisites or corequisites: Chemistry 350 and Zoology 225.
Textbook: Starling, *Principles of Human Physiology,* 13th Edition. Edited by Davson and Eggleton.

An.Sc. 310. Anatomy and Applied Physiology (0-0; 3-3)

T. D. Groves, J. G. O'Donoghue and D. R. Clandinin

Gross anatomy of farm animals and poultry, physiology of the rumen, reproduction and lactation with supporting laboratory exercises.
Prerequisites: Chemistry 350 and Zoology 225.
Textbook: Salisbury and Van Demark, *Physiology of Reproduction and Artificial Insemination of Cattle.*

An.Sc. 370. Livestock Production and Management (3-3; 0-0)

L. W. McElroy, W. Combs and C. M. Grieve

Production and management problems associated with major types of livestock enterprises. Livestock and livestock products markets and government policies in relation to production and management practices.

An.Sc. 468. Fundamentals of Nutrition (3-3; 0-0)

J. P. Bowland and A. R. Robblee

A study of the various nutrients including their character, functions and sources; digestion and metabolism.
Laboratory—analysis of feeding stuffs and the development of representative nutritional deficiencies in animals or poultry.
Prerequisite: Chemistry 350.

An.Sc. 469. Animal Nutrition (0-0; 3-3)

L. W. McElroy, J. P. Bowland and C. M. Grieve

The application of nutritional principles and practices to the feeding of different classes of farm animals; principles in planning and conducting nutritional experiments.
Prerequisite: Animal Science 468 or permission of Department.
Textbook: Morrison, *Feeds and Feeding,* 22nd Edition.

An.Sc. 470. Project Course (2 to 4P; 2 to 4P)

Library and laboratory study with a written report on a selected problem in livestock or poultry production, nutrition, breeding or physiology. Open only to fourth-year students.

An.Sc. 480. Population Genetics and Animal Improvement (3-3; 0-0)

R. T. Berg and W. Combs

Gene behavior in populations; influence of mutation, migration, genetic drift and selection. Genetics of natural selection and evolution.
Laboratory—problems associated with animal improvement.
Prerequisite: Genetics 360 or equivalent.
Textbook: Falconer, *Introduction to Quantitative Genetics.*

An.Sc. 482. Animal Breeding—R. T. Berg and W. Combs (0-0; 3-3)

A review of methods used in the breeding of livestock. A critical appraisal of selection theory, heritability estimation, environmental effects

and correlation of characters in livestock breeding. Review of recent experiments.
Laboratory—biometrical techniques.
Prerequisite: Animal Science 480 or Genetics 481.

An.Sc. 501. Research Projects (2 to 6P; 2 to 6P)
One or more topics are selected for intensive laboratory or library study or both. A comprehensive written report is required.

An.Sc. 512. Advanced Nutrition (3-3; 3-0)
A lecture and reading course; classical studies, experimental techniques and recent advances in nutrition.
Laboratory—experience in nutritional experimentation.

An.Sc. 600. Seminar (1S-0; 1S-0)
Reports by students on studies of the literature on selected topics with group discussion. Required each year of all graduate students.

Biometrics

Biom. 604. Statistical Techniques in Animal Research—R. T. Berg
See—BIOMETRICS.

Poultry Science

Po.Sc. 352. Poultry Production—D. R. Clandinin (0-0; 3-3)
Principles and practices applicable to efficient production of various classes of poultry.

Po.Sc. 453. Poultry Breeding—R. T. Hardin (3-3; 0-0)
Application of principles of genetics to breeding and improvement.
Prerequisite: Genetics 360 or equivalent.

Po.Sc. 455. Poultry Nutrition—A. R. Robblee (0-0; 3-3)
Nutritional requirements; effects of deficiencies; application of nutritional principles.
Prerequisite: Animal Science 468 or permission of Department.

Po.Sc. 459. Processing Poultry and Poultry Products—A. R. Robblee (3-0; 0-0)
Factors influencing product quality; preservation of eggs and poultry meats.

Po.Sc. 460. Poultry Diseases and Hygiene—D. R. Clandinin (0-0; 3-3)
A study of the more important diseases of poultry—causes, symptoms, prevention and control.

Veterinary Science

Vet.Sc. 451. Veterinary Science—J. G. O'Donoghue (1-0; 1-0)
Sanitation in relation to control of diseases; use of biologics; reproductive disorders; Animal Contagious Diseases Act.

BIOCHEMISTRY

Bioch. 300. General Course—Members of Staff (3-3; 3-3)

Structure and chemistry of the cell; acidimetry and alkalimetry; chemistry of carbohydrates, lipids, proteins and nucleic acids; enzymes; bioenergetics; digestion, absorption and intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids; mineral metabolism; vitamins; blood chemistry; chemistry of respiration.

Prerequisites: Chemistry 230, Chemistry 250.

Plant Biochemistry
(See Plant Physiology and Biochemistry)

BIOLOGY

Biol.130. (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biol. 230. (3-3; 3-3)

1st Term or 2nd Term

Plant form and function. Comparative morphology and physiology of plants at an intermediate level.

2nd Term or 1st Term

Comparative Zoology. Animal morphology, physiology and development at an intermediate level.

Prerequisite: Biology 30 or 130.

BIOMETRICS

Biom. 455. Statistics for Biological Research (3-3; 3-3)

Saul Zalik (Plant Science)

Principles and methods of statistical analyses applied to biological data; with emphasis on sampling, chi-square and t-tests, regression and correlation, analysis of variance (major emphasis), covariance, partial and multiple correlation and regression, individual degrees of freedom, transformation of data, simple experimental designs.

Textbook: Steel and Torrie, *Principles and Procedures of Statistics.*

Biom. 604. Statistical Techniques in Animal Research (2-3; 0-0)

R. T. Berg (Animal Science)

Advanced design, analysis and interpretation of experiments in animal research with emphasis on efficient planning, error control, unequal subplot techniques, components of variance and covariance. Supporting laboratory exercises.

Prerequisite: Biometrics 455 *or* Math. 450.

(Not offered 1964-65)

Biom. 605. Design of Experiments—L. P. V. Johnson (Genetics) (0-0; 2-3)

Complex experiments, single degrees of freedom, factorial experiments, split-plot experiments, lattice designs, balanced incomplete-block design, long-term experiments.

Prerequisite: Biometrics 455, Math. 450 or permission.

BOTANY

Bot. 300. Flowering Plants (3-3; 3-3)

The origin and evolution of flowering plants; their morphology and classification; species concepts; plants in relation to their environment; principles of nomenclature.

Prerequisite: Biology 230 or consent of department.

Bot. 310. Plant Anatomy and Histology (3-3; 3-3)

A course in the structure and development of organs and tissues of the higher plants. Emphasis is placed on the experimental approach to anatomical studies and on development and morphology.

Prerequisite: Biology 230 or consent of department.

Bot. 320. Plant Physiology (3-3; 3-3)

First Term: Physical Phenomena in living cells; water relationships of plants.

Second Term: Respiration, photosynthesis and growth.

Prerequisites or Corequisites: Biology 230; Chemistry 230; Chemistry 250 or 350.

Bot. 341. Mycology (3-3; 0-0)

A systematic survey of the fungi with detailed study of representatives of major groups. Emphasis is given to classification, life cycles and distribution.

Prerequisite: Biology 230 or consent of department.

Bot. 342. Physiology of Fungi (0-0; 3-3) or (3-3; 0-0)

Factors affecting growth and reproduction of fungi; beneficial and harmful activities of fungi.

Prerequisite: Biology 230 **and** Botany 341 or consent of department

CHEMISTRY

Chem. 230. Inorganic Chemistry (3-1S-3) (3-1S-3)

Lectures: The fundamental concepts of chemistry as applied to the elements and their compounds.

Laboratory: The preparation of compounds, quantitative chemistry, and semi-micro qualitative analysis.

Prerequisite: Chemistry 130 or 30 of High School or equivalent.

Chem. 250. Organic Chemistry (3-3; 3-3)

Lectures: An introduction to a study of the compounds of carbon.

Laboratory: The preparation of some organic compounds.

Textbook: Fieser and Fieser, *Organic Chemistry;* or Noller, *Textbook of Organic Chemistry.*

Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

Chem. 350. Organic Chemistry (3-3; 3-3)

Lectures: An introduction to a study of the compounds of carbon.

Laboratory: The preparation of some organic compounds.

Prerequisite: Chem. 230.

Chem. 370. Elementary Physical Chemistry (3-3; 3-3)

Lectures: Fundamental concepts of matter in relation to energy; thermochemistry; properties of gases, liquids and solids; solutions, equilibrium; phase rule; electrochemistry, colloids, kinetics of reaction.
Laboratory: Physical chemical measurements.
Prerequisites: Chem. 230, Math. 200 or 201.

CIVIL ENGINEERING

Junior Course (offered only by arrangement with Civil Engineering Dept.)

Civ.E. 152. Surveying Daily for two weeks at end of second term
Survey School Staff

A condensed course in the theory and practice of plane surveying as applied to irrigation works; including construction, use and care of instruments; simple computations. Field work, including chaining, rodding, levelling, transit work, note-keeping and the plotting of notes.
Available only to students from the Faculty of Agriculture who are registered for Irrigation Options.
Textbook: Davis and Foote, *Surveying*, (McGraw-Hill).

Senior Course (offered only by arrangement with the Civil Engineering Dept.)

Civ.E. 338. Principles of Irrigation and Drainage—A. W. Peterson (2-0; 2-0)
Elementary problems of hydraulics and drainage as applied to the lay-out of irrigation systems. Waterlogging and alkali formation.

DAIRY SCIENCE

Courses in Dairy Science are given in the following divisions: Dairy Science, Dairy and Food Technology, Dairy and Food Microbiology, Dairy and Food Chemistry. The degree can be taken in one of four programs. (See Third and Fourth Years, under PROGRAMS OF STUDY).

STAFF:
Professor and Head—L. F. L. Clegg
Associate Professors—J. M. deMan, F. W. Wood
Assistant Professor—H. Jackson

Dairy Science

Dairy. 241. Principles of Milk Production—L. F. L. Clegg (0-0; 3-3)
Milk secretion. Mechanics and operation of machine milking. Mastitis and milking procedure. Systems of milking. Cleaning and sterilization of dairy equipment. Local authority control of quality milk.

Dairy. 490. Reading Project: Critical Reviews of Selected Literature
L. F. L. Clegg, F. W. Wood and J. M. deMan
Maximum yearly credit one full course.
(For third and fourth year students only.)

Dairy. 500. Seminar—L. F. L. Clegg, F. W. Wood, and J. M. deMan (1S-0; 1S-0)
Reports and discussions of research problems. Required during each year of all graduate students in the department.

Dairy and Food Technology

Dairy. 352. Food Processing—F. W. Wood (3-3; 0-0)
The scientific and technical principles involved in unit operations and processes applied in the commercial manufacture of dairy and other food products.
Textbook: Parker, Harvey and Stettler, *Elements of Food Engineering*, Vols. 1, 2 and 3.
Corequisite: Ag.Eng. 305 or permission of department.

Dairy. 353. Food Processing—F. W. Wood (0-0; 3-3)
The application of unit operations and processes in the commercial manufacture of dairy and other food products. To include heat exchanging, pumping, disintegrating, emulsifying, evaporating and condensing, storing and packaging.
Prerequisite: Food Processing 352 or permission of department.

Dairy. 451. Food Processing—F. W. Wood (3-3; 0-0)
A study of the commercial processing of food products with particular emphasis on the unit operations involved in canning fruits and vegetables. The function of management and quality control; grading and packaging standards.
Textbook: Cruess, *Commercial Fruit and Vegetable Products.*
Corequisite: Ag.Eng. 305 or permission of department.

Dairy. 452. Food Processing—F. W. Wood (0-0; 3-3)
A study of freezing, dehydration, freeze drying, concentration and fermentation of commercial foods. New product development and marketing of processed foods. Instruction will include pilot plant processing and field trips to processing plants.
Corequisite: Ag.Eng. 305 or permission of department.

Dairy. 600. Advanced Dairy and Food Technology
F. W. Wood and L. F. L. Clegg
Specially selected problems intensively studied. May be required during each year of graduate study.

Dairy and Food Microbiology

Dairy. 465. Food Microbiology—L. F. L. Clegg (3-3; 0-0)
The microbiology of the food and allied industries including sterilization and preservation (canning, freezing, radiation), food poisoning, food spoilage, the contamination of air and water, the disposal of domestic and industrial wastes.
Prerequisite: Microbiology 360 or permission of department.

Dairy. 466. Dairy Microbiology—H. Jackson (0-0; 3-3)
The bacteriology of the production and distribution of fluid milk and cream and consideration of some of the problems of the market milk industry. Milk supplies and public health. The bacteriological and biochemical aspects of pasteurization. The bacteriology of butter, cheese, ice cream and other milk products.
Prerequisite: Microbiology 360 or permission of department.

Dairy. 467. Advanced Industrial Food Microbiology (0-3; 0-3)
H. Jackson and L. F. L. Clegg

A laboratory lecture course covering some advanced techniques in microbiology including small scale industrial fermentation, and the principles underlying the hygienic production of foods and dairy products and methods for the detection of faults in dairy and food processing plants.

Prerequisites: Dairy 465 or 466 or permission of department.

Dairy. 468. Industrial Microbiology—H. Jackson and L. F. L. Clegg (3-0; 3-0)

The utilization of micro-organisms in the production of alcoholic beverages, industrial solvents, organic acids, antibiotics, fats and vitamins; the biological utilization of wastes; micro-organisms as a source of food materials; microbial preservation of foods.

Prerequisite: Plant Physiology and Biochemistry 431 and 432 or Biochemistry 300 and Microbiology 360 or Dairy Science 465 or 466 or permission of department.

Dairy. 601. Advanced Applied Microbiology—L. F. L. Clegg and H. Jackson

Specially selected problems intensively studied. May be required during each year of graduate study.

Dairy and Food Chemistry

Dairy. 474. Food Analysis and Quality Control—J. M. deMan (3-3; 0-0)

The scientific principles underlying the chemical, physical and sensory methods of food analysis. Qualitative and quantitative estimation of food constituents and chemical additives. Application of instrumental methods to the analysis of foodstuffs.

Prerequisites: Chemistry 230, Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300 or permission of department.

Dairy. 475. Food Chemistry—J. M. deMan (0-0; 3-3)

Chemical and physical properties and composition of food fats, proteins and carbohydrates. Food flavors, additives in foods. Effect of processing on some chemical and physical properties of foods.
Textbook: Meyer, *Food Chemistry.*

Prerequisite: Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300 or permission of department.

Dairy. 476. Dairy Chemistry—J. M. deMan (3-3; 0-0)

Biochemistry of milk formation and secretion. Composition of milk. Chemistry of the major and minor constituents of milk. Enzymic and non-enzymic deterioration reactions. Flavors and off-flavors. Physical properties of milk and milk products. Changes in chemical and physical properties caused by processing.

Textbook: Jenness and Patton, *Principles of Dairy Chemistry.*

Prerequisite: Food Chemistry 475 or permission of department.

Dairy. 571. Advanced Food Chemistry—J. M. deMan (0-0; 3-3)
The relation of food constituents to industrial processes. Enzymic and non-enzymic deterioration reactions in foods. Surface chemistry. Flavor and sensory testing. Rheology of foodstuffs.
Prerequisite: Plant Biochemistry and Physiology 431 and 432, Biochemistry 300 or permission of department.

Dairy. 572. Chemistry of Fats and Oils—J. M. deMan (0-0; 1-3)
Composition, structure and properties of the various lipid classes. Synthesis and structure of the various fatty acids and glycerides. Technical processes used in the production and refining of edible fats. Autoxidation and antioxidants. Glyceride structure of natural fats. Crystallization behaviour and polymorphism. Modern analytical methods used in the field of fats and oils.
Prerequisite: Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300, and Dairy and Food Chemistry 475.

Dairy. 602. Advanced Dairy and Food Chemistry
J. M. deMan and L. F. L. Clegg
Specially selected problems intensively studied. May be required during each year of graduate study.

ECONOMICS

Econ. 200. Principles of Economics—Members of the Department (3-0; 3-0)
A survey of various aspects of economics: The nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy.
(Prerequisite for all senior Economics courses except 310, 311, and 330.)

Econ. 300. Micro-Economic Analysis (3-0; 3-0)
The theory of consumer behavior; price and output determination under competition, monopoly and other market structures; the allocation of resources and resource pricing; the distribution of income.
Prerequisite: Economic 200 or 302.

Econ. 367. Agriculture in The Canadian Economy—E. Berg (3-0; 0-0)
The nature and scope of agricultural economics; size and organization of Canadian agriculture in relation to the economy as a whole; structure of the agricultural sector; technology and structural change within agriculture; economic growth, and policies for adjustment.
Prerequisite: Economics 200 or 302.

Econ. 368. Agriculture in An International Setting—E. Berg (0-0; 3-0)
A survey of the world structure of agricultural production, consumption, and trade; international agricultural policies and agreements; impact of regional economic integration on agriculture; interrelation of economic development and trade in agricultural commodities.
Prerequisite: Economics 200 or 302.

Econ. 560. Agriculture in Developing Countries—E. Berg (3-0; 3-0)
An analysis of the role and problems of agriculture in developing countries.

ENGLISH

Engl. 210. English Language and Literature (3-0; 3-0)
English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

ENTOMOLOGY

STAFF:
Professor and Head—Brian Hocking.
Associate Professors—G. E. Ball, W. G. Evans.
Assistant Professor—Janet Sharplin

Ent. 200. A General Introduction to Entomology (3-3; 0-0)
B. Hocking and W. G. Evans
The structure and life cycles of insects. An introduction to classification. The relationships of insects with their environment and with other forms of life as a basis to an appreciation of their significance in agriculture.
Textbook: Imms, *Outlines of Entomology.*
Prerequisite: Biology 30 or 130 or equivalent

Ent. 201. General Entomology—B. Hocking and G. E. Ball (3-3; 3-3)
Probable origin of insects, their structure and development. Introduction to classification. Their relationships with other forms of life as a basis to an appreciation of their significance in connection with agriculture and human health.
Textbook: Imms, *Outlines of Entomology.*
Prerequisite: Biology 30 or 130 or equivalent

Ent. 314. Insect Morphology—Janet Sharplin (2-6; 2-6)
A detailed study of the structure of insects from the comparative and functional viewpoints.
Textbook: Snodgrass, *Principles of Insect Morphology.*
Prerequisite: Entomology 300 or 301.

Ent. 471. A Project in Applied Entomology—Staff
A survey of the literature on one or more topics in applied entomology with or without an experimental study of a related simple problem. Credit according to work done, up to a maximum of one full course.

Ent. 476. Insect Toxicology—W. G. Evans (2-4; 2-4)
The chemistry of insecticides and repellents and of accessory materials. Methods of insecticide evaluation. Theories of insecticidal activity.
Textbook: Shepard, *The Chemistry and Action of Insecticides.*
Prerequisite: Chemistry 250 or 350, Entomology 300 or 301 desirable.

Ent. 522. Insect Taxonomy—G. E. Ball (2-6; 2-6)
Taxonomic principles and procedures. Classification of insects; habits

of all important groups. Zoological nomenclature. Speciation, phylogeny, zoogeography.
Textbook: Mayr, Linsley, and Usinger, *Methods and Principles of Systematic Zoology.*
Prerequisite: Entomology 300 or 301, 414 desirable.

Ent. 556. Insect Physiology—B. Hocking (2-5; 2-5)
Life processes illustrated by insects with emphasis on those peculiar to them and their relatives.
Textbook: Wigglesworth, *The Principles of Insect Physiology.*
Prerequisite: Entomology 300 or 301, 414 desirable.
Permission of the instructor is required for registration.

Ent. 560. Insect Ecology—W. G. Evans (2-5: 2-5)
The relationships of insects to their environment with emphasis on the factors which influence the distribution of insects in time and space. Associations between insects and other organisms. Populations.
Prerequisite: Entomology 301, or Entomology 300 and 471.

Ent. 610. Advanced Morphology and Histology—B. Hocking
A continuing course from Entomology 314 including a detailed study of internal structure. Credit according to work done, up to a maximum of one full course.
Textbook: Wigglesworth, *The Principles of Insect Physiology.*

Ent. 621. Advanced Taxonomy—G. E. Ball (0-6; 0-6)
Classification and biology of, and literature on, one or more of the major orders.
Prerequisite: Entomology 522.

Ent. 650. A Project in Insect Physiology
A review and interpretation of literature on a selected topic with an experimental study of a related problem. Credit according to work done, up to a maximum of one full course.

GENETICS

Courses offered by the Department of Genetics are arranged under the designations: Genetics, Field Crops, and Biometrics.

STAFF:—
Professor and Head—Clayton Person
Professor—L. P. V. Johnson
Associate Professors—K. A. Lesins, W. E. Smith
A number of staff members engaged in genetic studies in other departments are to be associate members of the Genetics Department.

Genet. 351. Genetics (3-3; 3-3)
A fundamental course in genetics covering the following basic principles and processes: Physical bases of heredity, Mendelian inheritance, inheritance of sex, linkage, quantitative inheritance, gene structure and function, gene mutation and chromosomal aberrations, populations and races,

developmental genetics, cytoplasmic inheritance, human genetics and eugenics, and additional topics.
Textbook: Snyder and David, *Principles of Heredity.*

Genet. 360. Genetics (0-0; 3-3)
The physical bases of heredity, Mendelian inheritance, inheritance of sex, linkage, quantitative inheritance, gene structure and function, gene mutation and chromosomal aberrations, cytoplasmic inheritance, developmental genetics, populations and races, human genetics and eugenics.
Textbook: Srb and Owen, *General Genetics.*

Genet. 411. Cytology (3-3; 0-0)
Structural and biochemical organization of the cell in relation to metabolism, division, and differentiation with emphasis on nucleus and chromosomes. The application of classical and modern analytical techniques of cytology in the laboratory.
Prerequisite: Genetics 351 or equivalent.

Genet. 413. Chromosome Mechanics (3-3; 0-0)
Detailed analysis of the genetic control of meiotic and mitotic events, analysis of crossing over and its mechanisms, position effects, position pseudoalleles, and genetic behavior of chromosome aberrations.
(Not given in 1964-65)
Prerequisite: Genetics 351 or equivalent.

Genet. 415. Cytogenetics (0-0; 3-3)
Advanced topics in cytogenetics: chromosome structure; cytogenetic behavior and evolution of chromosome aberrations; polpyloidy and aneuploidy; sex determination; balanced-lethal systems; karyotype analysis; endomitosis; chromosome diminution and elimination.
Prerequisite: Genetics 351 or equivalent.

Genet. 430. Microbial Genetics (3-0; 0-0)
Detailed analysis of genetic phenomena peculiar to micro-organisms. Transduction; transformation; tetrad analysis; copy-choice mechanisms; heterokaryosis and parasexuality.
Textbook: Herskowitz: *Genetics.*
Prerequisite: Genetics 351 or equivalent.

Genet. 463. Genetic Basis of Plant Breeding (0-0; 3-0)
Emphasis is placed on principles rather than materials and methods in approaching the breeding of plants classified as to reproductive systems. Coverage includes polyploidy and aneuploidy, interspecific hybridization, induced mutation, selection responses, heterosis, and breeding for disease resistance.
Textbook: Allard, *Principles of Plant Breeding.*
Prerequisite: Genetics 351 or 360.

Genet. 481. Population Genetics (3-0; 0-0)
Gene behavior in populations; influence of mutation, migration, genetic drift and selection. Genetics of natural selection and evolution.
Textbook: Falconer, *Introduction to Quantitative Genetics.*
Prerequisite: Genetics 351 or 360.

Genet. 505. Reading and Research Projects in Genetics and Plant Breeding
A course in which individual students select a topic for intensive study and prepare a written report. Regular meetings for discussion. Credit according to work done, with a maximum of six hours.

Genet. 517. Genetical Statistics (3-3; 0-0)
Principles and methods of biometrical analyses applied to specific genetic problems such as quantitative inheritance and linkage. Adaptation of standard designs to genetic experimentation. Emphasis throughout is on effective experimental planning and critical interpretation of genetic data.
Textbook: Bailey, *Introduction to the Mathematical Theory of Genetic Linkage.*
Prerequisite: Genetics 351 or equivalent.

Genet. 545. Biochemical Genetics (0-0; 3-0)
The genetic control of protein synthesis, nucleocytoplasmic relationships, the molecular meaning of genetic recombination and mutation, biochemical approaches to the coding problem.
Textbook: Strauss, *Chemical Genetics.*
Prerequisite: Genetics 351 or equivalent.
(Not given in 1964-65)

Genet. 552. Radiation Genetics (0-0; 3-3)
The biological effects of ionizing and non-ionizing radiation upon chromosomes and cells, mutagenesis in the broad sense, target theory, protectors, radioactive isotope studies.
Prerequisite: Genetics 351 or equivalent.

Genet. 583. Evolutionary Genetics (3-0; 0-0)
Chromosomal changes, polyploidy, hybrid sterility and other factors leading to genetic isolation; meiotic drive, genetic feed-back and other microevolutionary processes; evolution of parasitism, mimicry and other systems that involve balanced polymorphism.
Prerequisite: Genetics 351 or equivalent.

Genet. 586. Developmental Genetics (0-0; 3-0)
Detailed study of gene-controlled processes of development and differentiation; lethal factors; use of genetic markers to study cell lineage; mechanism of differential gene activation by controlling elements; cytoplasmic influences; phenocopies.
Prerequisite: Genetics 351 or equivalent.

Genet. 590. Classical Contributions in Genetics (3-0; 0-0)
Designed to acquaint students with papers which have stimulated rapid advances in genetics by introducing a new basic concept or technique. A historical approach will begin with Mendel's papers and develop through Morgan, Bridges, Sturtevant, Muller, Stadler, Stern, Beadle and Tatum, Auerbach, Watson and Crick, Benzer, Niremberg and Matthaei, and others.
Prerequisite: Genetics 351 or equivalent.
(Not given in 1964-65)

Genet. 601. Genetics Seminar
Prerequisite or corequisite: Biochemistry 300.

Genet. 610. Current Problems in Genetics (0-0; 3-0)
Detailed discussion of current literature designed to acquaint the student with the active areas of modern genetic research; student participation is expected in both discussions and presentation of lectures.

Genet. 635. Advanced Microbial Genetics (0-4; 0-4)
An advanced laboratory conference course dealing with genetics of fungi, bacteria and bacteriophages

Genet. 640. Advanced Genetics (3-0; 0-0)
A seminar course for detailed analysis of a specific area of current interest. The topic will be changed from year to year. The course will comprise lectures by staff members, student reports on assigned topics, and informal discussion.

Genet. 650. Genetics of Parasitic Systems (3-0; 0-0)
Genetic aspects of parasitism, including Flor's hypothesis of gene-for-gene relationships, applications of the gene-for-gene concept, and methods used in analysing complex parasitic systems.
(Not given in 1964-65)

Biometrics

Biom. 605. Design of Experiments
See BIOMETRICS.

Field Crops

F.Cr. 354. Forage Crops (0-0; 3-3)
Cultivated forage legumes and grasses: their morphological, physiological and nutritional characteristics; their suitability for hays and pastures, and their conservation as hay and silage. Principles of silage making; use of additives. Rational utilization of pastures. Laboratory identification of forages at their vegetative and flowering stages, and by seeds. Botanical analysis of hay. Evaluation of seed material.

F.Cr. 355. Cereal and Specialty Crops (3-3; 0-0)
Economically important cereal and specialty crops produced in North America, their history, classification, structure, adaptation, distribution and use. The laboratory consists of a study of gross morphology and taxonomy of widely-grown field crops.

F.Cr. 503. Reading Projects
A course in which individual students select a topic for intensive study in the library and prepare a written report. Regular meetings for discussion. Credit according to work done, with a maximum of six hours.

F.Cr. 504. Research Projects
Investigation of special problems involving field or laboratory study. Credit according to work done, with a maximum of six hours.

GEOLOGY

Geol. 201. General Geology—R. E. Folinsbee (3-3; 3-3)
Processes of destruction and reconstruction; interpretation of physiographical features with map study; stratigraphic column with index fossils from each period; common minerals and rocks.
Textbook: Holmes, *Principles of Physical Geology* or Gilluly et al., *Principles of Geology.*

Geol. 202. Physical Geology—R. E. Folinsbee (3-3; 0-0)
An introduction to the study of the earth, materials of the earth's crust, minerals and rocks, geological processes and time.
Textbook: Holmes, *Principles of Physical Geology.*

Geol. 302. Geology and Mineral Deposits of Canada—H. S. Armstrong (3-3; 3-3)
The study of the geological regions of Canada; their stratigraphy, structure, and mineral deposits.
Prerequisite: Geology 201 or consent of department.

Geol. 465. Geomorphology (3-3; 0-0)
A study of land forms and the processes which create and modify them; map reading; field trips.
Textbook: Thornbury, *Principles of Geomorphology.*
Prerequisite: Geology 202 or consent of department.

Geol. 466. Glacial Geology—L. A. Bayrock (0-0; 3-3)
A study of glacial features and their relation to physiographic development; map reading; field trips.
Textbook: Flint, *Glacial and Pleistocene Geology.*
Prerequisite: Geology 201 or 202.

MATHEMATICS

Math. 180. Trigonometry and Polynomial Calculus (4-0; 4-0)
Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentiation and integration of elementary functions. Applications.
Prerequisite: Mathematics 30 or its equivalent.

Math. 201. Introductory Calculus (5-0; 5-0)
Rates of change. Differentiation and integration of simple functions. Applications. Analytic geometry of the conic sections. Exponential, logarithmic and trigonometric functions.
Prerequisite: Mathematics 30 and 31 or their equivalent.
Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 201 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101).

Math. 220. Elementary Calculus (3-0; 3-0)
Differentiation and integration of trigonometric functions. Polar coordinates. Logarithmic and exponential functions. Conic sections. Areas and volumes.
Prerequisite: Mathematics 180.

Math. 304. Calculus and Analytical Geometry (3-2; 3-2)
Polar and parametric coordinates. Methods and applications of integration. Infinite series. Vectors and space geometry. Partial differentiation. Elements of differential equations. Multiple integration.
Prerequisite: Mathematics 201 or 220.

MICROBIOLOGY

Bact. 201. Elementary Bacteriology (3-3; 0-0)
General bacteriology; the importance of bacteria in everyday life. Demonstrations and practical laboratory exercises.

Micrb. 360. Microbiology (3-3; 3-3)
G. E. Myers, J. W. Carmichael, J. N. Campbell, and T. Yamamoto
A course in general microbiology including classification, physiology and metabolism, serving as an introduction to the practical application of this knowledge to industrial processes, specific fields of animal and plant biology and public health.
The laboratory course illustrates the basic methods of studying microorganisms and their products and introduces the principles of the application of this knowledge.
Prerequisites: A university course in Chemistry and Botany 202.
Textbook: Stanier, Doudoroff, Adelberg—*The Microbial World,* or Pelczar and Reid—*Microbiology.*

MODERN LANGUAGES

French

Fren. 100. Beginners' French (5-0; 5-0)
This course is designed to enable students entering with complete matriculation but without French to begin their study of this language in the University. Normally, students will go from French 100 to French 200.

Fren. 200. First Year University French (3-1; 3-1)
This is an intensive course in reading modern French, French grammar and composition.
Prerequisite: Grade XII French or French 100.

German

Germ. 210. Scientific German (3-0; 3-0)
This course will cover the elements of German grammar. It aims to give students a reading knowledge of easy scientific German. It is designed to meet the needs of honors students from Science departments, students of the professional faculties and graduate students who require a knowledge of scientific German.

Russian

Russ. 210. Beginners' Russian (Science Section) (3-0; 3-0)
This course is designed to meet the needs of honors students in the science departments, students of the Faculties of Engineering, Agricul-

ture, Dentistry, Medicine and Graduate Studies of any year who require a reading knowledge of Russian scientific literature.

PHYSICAL EDUCATION

All first-year students are required to register in Phys. Ed. 218—Men or Phys. Ed. 228—Women.

P.Ed. 218. Recreational Activities—Physical Education Staff (Men) (0-2; 0-2)
Emphasis on the fundamentals of the following recreational and fitness activities: circuit training, aquatics, handball, badminton, volleyball, tumbling and apparatus.

P.Ed. 228. Recreational Activities—Physical Education Staff (Women) (0-2; 0-2)
Emphasis on the fundamentals of the following recreational and fitness activities: aquatics, movement fundamentals, tennis, badminton, dance and golf.

PHYSICS

Phys. 100. General Elementary Physics (3-3; 3-3)
An introductory course on the basic principles of Physics, illustrated by experiments.
For students who have not completed Physics of Grade XII.

Phys. 200. General Physics (3-3; 3-3)
A general course in the fundamentals of physics, including mechanics, properties of matter, heat, sound, electricity and light, illustrated by experiments. For students who have completed Physics of Grade XII. (NOTE: Students will not be able to take a further course in Physics without taking Mathematics 201. Physics 200 may not be taken as a second course following Physics 100.)
Physics 100 is a terminal course. It is the only choice available to students lacking credit in Grade XII physics, and does not fulfil prerequisite requirements to any senior physics courses. Physics 200 may be taken following Grade XII physics; it is accepted as a prerequisite for certain courses on advanced topics in physics.

PLANT SCIENCE

Courses offered by the Department of Plant Science are arranged under the designations: Plant Science, Biometrics, Horticulture, Plant Pathology, Plant Physiology and Biochemistry, and Weed Science.
Note: Field Crops and Forage Crops are listed under Genetics.

STAFF:

Professor and Head—Wm. G. Corns

Professors—A. G. McCalla, Plant Biochem.; Saul Zalik, Plant Phys. and Biochem.; Mary S. Spencer, Plant Phys. and Biochem.

Associate Professors—W. T. Andrew, Horticulture; R. H. Knowles, Horticulture; W. P. Skoropad, Plant Pathology.

Assistant Professors—Wm. H. Vanden Born, Weed Science; E. W. Toop, Horticulture; N. Colotelo, Plant Pathology.

Plant Science

Pl.Sc. 356. Rangeland Vegetation—Wm. G. Corns (0-3L; 0-0)

Occurrence, identification, characteristics and habits of some grasses, weeds and other vegetation of grassland and forest regions in relation to their utilization and conservation.

(Recommended as a prerequisite or corequisite for Plant Science 357)

Pl.Sc. 357. Vegetation Control and Applied Ecology—Wm. G. Corns (3-0; 0-0)

Ecological factors affecting the regional distribution of different types of vegetation and land use. Properties and use of herbicides and other plant growth-regulators in relation to development and management of grassland and forest vegetation. Associated agronomic practices for rangeland improvement, land clearing and breaking for crops. Weed problems and vegetation control in industrial sites, wild-life regions, parks and aquatic areas.

(Recommended as a corequisite for Plant Science 356)

(Note related courses under Weed Science)

Pl.Sc. 500. Seminar in Plant Science (0-1S; 0-1S)

Oral reports by individual students covering the literature on selected topics. Required each year of all graduate students in Plant Science.

Biometrics

Pl.Sc. 455. Statistics for Biological Research

See BIOMETRICS.

Field Crops

F.Cr. 354, 355, 503 and 504

See GENETICS

Horticulture

Hort. 341. General Horticulture (0-0; 3-3)

Wm. T. Andrew and R. H. Knowles

Elementary course designed for those students who do not wish specialized instruction in the various phases of horticulture. A survey of world horticulture, with an introduction on propagation, culture, nutrition, and utilization of horticultural plants. Laboratory work in propagation and cultural practices.

Hort. 352. Principles of Horticulture (3-3; 0-0)

Wm. T. Andrew and E. W. Toop

A general course in horticulture, with special emphasis on the physiology of horticultural crops. Laboratory practice in systematic horticulture; culture, marketing, and preservation of crops; their economic importance and value as foods.

Prerequisite: Botany 202.

Hort. 360. Systematic Horticulture—Staff (0-3; 0-0)

A course designed for the student with special interests in horticulture. A study of the classification, nomenclature, adaptation and morphology of horticultural plants.

Hort. 454. Fruit Crops (0-0; 3-3)

Previously designated as Horticulture 54.
Methods of tree fruit and small fruit propagation, production and marketing, discussion of cultural practices and nutrition.

Hort. 455. Vegetable Crops—Wm. T. Andrew (0-0; 3-3)

Previously designated as Horticulture 55.
Classification, food value, seedage, plant growing techniques, nutrition, harvesting, grading, packing and packaging, storage and marketing of important vegetable crops.

Hort. 456. Landscape Architecture—R. H. Knowles (3-3; 0-0)

An introductory course covering: (1) The elements and principles of design; (2) the application of these principles to the arrangement of objects in space; (3) The identification and use of hardy plant materials; (4) Problems in landscape design in which technological, social and economic requirements are considered in relation to the aesthetics of planning.

Hort. 457. Floriculture—E. W. Toop (0-0; 3-3)

The principles and practices of growing florist's crops under glass. The effect of environment on growth and development of specific crops.

Hort. 507. Reading Projects in Horticulture—Staff

A course in which the individual student selects a topic for intensive study in the library and prepares a written report. Regular meetings for discussion. Credit according to work done, with a maximum of six hours.

Hort. 508. Research Projects in Horticulture—Staff

Investigation of special problems involving field or laboratory study. Credit according to work done, with a maximum of six hours.

Hort. 509. Selected Topics in Horticulture—Staff

A course in which the recent developments of special interest to the horticulturist will be discussed at an advanced level, with special emphasis on modern techniques in horticultural research. Credit according to work done, with a maximum of six hours.

Plant Pathology

Pl.Pa. 408. Elements of Plant Pathology—W. P. Skoropad (3-3; 0-0)

An introductory study of the nature, cause, and control of plant diseases.
Prerequisite: Botany 201 or 202.

Pl.Pa. 481. Diseases of Field Crops—N. Colotelo (3-3; 0-0)

Diseases affecting grain, forage, and other field crops.
Prerequisite: Plant Pathology 480.

Pl.Pa. 482. Diseases of Horticultural Crops—W. P. Skoropad (0-0; 3-3)

Diseases affecting potato, vegetable, fruit, and ornamental plants.
Prerequisite: Plant Pathology 480.

Pl.Pa. 511. Reading Projects in Plant Pathology—Staff
A course in which the individual student selects a topic for intensive study in the library and prepares a written report. Regular meetings for discussion. Credit according to work done, with maximum of six hours.

Pl.Pa. 512. Research Projects in Plant Pathology—Staff
Investigation of special problems involving field or laboratory study. Credit according to work done, with a maximum of six hours.

Pl.Pa. 631. Advanced Plant Pathology—Staff
Principles of plant pathology, theoretical and applied.
Prerequisite: Plant Pathology 480 or the equivalent.

Pl.Pa. 635. Plant Pathogenesis—N. Colotelo (3-0; 0-0)
A critical review of the literature related to the physiology of diseased plants. Topics include respiratory patterns, effects of toxins and growth substances.
Prerequisites: Plant Pathology 480, Plant Physiology and Biochemistry 431 and 432 or equivalent.

Pl.Pa. 636. Plant Pathogenesis—N. Colotelo (0-0; 3-0)
A continuation of Plant Pathology 635. dealing with nitrogen and carbohydrate metabolism and the role of phenolic compounds in diseased plants.
Prerequisites: Plant Pathology 480, Plant Physiology and Biochemistry 431 and 432 or equivalent.

Plant Physiology and Biochemistry

Pl.Ph. 400. Physiology and Biochemistry of Crop Plants (0-0; 3-3)
Physiology and biochemistry of growth and development of crop plants.
Prerequisite or corequisite: Chemistry 350.

Pl.Ph. 431. Plant Biochemistry—Mary S. Spencer (3-3; 0-0)
An introduction to plant biochemistry, with consideration of the comparative aspects of biochemistry. Topics include intracellular structure, acidity and colloidal properties of protoplasm, chemistry and metabolism of carbohydrates, including respiration and photosynthesis.
Prerequisites: Chemistry 230 and Chemistry 250 or 350, or consent of the instructor.

Pl.Ph. 432. Plant Biochemistry—Mary S. Spencer (0-0; 3-3)
A continuation of Plant Biochemistry 431, this course deals with the biochemistry of lipids and related plant constituents, and the chemistry and metabolism of nitrogen-containing compounds.
Prerequisite: Plant Biochemistry 431.

Pl.Ph. 477. Cereal Chemistry—Saul Zalik (0-0; 3-3)
Lectures and laboratory periods dealing with techniques in cereal chemistry and oil seed processing. Biological, chemical, and physical factors affecting quality; grain grading; methods of analyses; milling, baking; malting and other technological processes.

Prerequisite: Plant Biochemistry 431 and 432, and Field Crops 355, or equivalents.

Pl.Ph. 513. Reading Projects in Plant Physiology and Biochemistry—Staff

A course in which the individual student selects a topic for intensive study in the library and prepares a written report. Regular meetings for discussion. Credit according to work done, with a maximum of six hours.

Pl.Ph. 514. Research Projects in Plant Physiology and Biochemistry—Staff

Investigation of special problems involving field or laboratory study. Credit according to work done, with a maximum of six hours.

Pl.Ph. 551. Advanced Plant Biochemistry (3-0; 0-0) or (0-0; 3-0)

Mary Spencer and E. Cossins

Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and of methods of investigation in these fields.

Prerequisites: Biochemistry 300, or Plant Physiology and Biochemistry 431 and 432 or consent of instructor.

Pl.Ph. 620. Plant Morphogenesis—Saul Zalik (2-2; 2-2)

An experimental approach to growth and differentiation in plants. Topics dealt with are: growth correlations; tissue culture; differentiation and regeneration; growth regulators and metabolites; external and internal factors.

Prerequisites: Plant Physiology and Biochemistry 431 and 432, Botany 320, Genetics 351 or consent of department.

Weed Science

Wd.Sc. 352. Weeds and Weed Control—Wm. H. Vanden Born (0-0; 3-3)

The nature and significance of weed problems in various phases of crop production. Vegetative and reproductive growth and development of crop plants and weeds in relation to weed control. Taxonomy of weeds. Cultural and chemical weed control. Classification, properties and use or herbicides. Other uses of plant growth regulating chemicals.

Wd.Sc. 460. Physiology of Herbicidal Action—Wm. H. Vanden Born (3-0; 3-0)

Absorption, translocation, mechanism of action of herbicides. Chemical and physical factors influencing herbicidal action. Selected topics.

Prerequisites: Botany 320 or Plant Physiol. and Biochem. 400; Crop Ecology 352.

Wd.Sc. 501. Reading Projects in Weed Science

Wm. G. Corns and Wm. H. Vanden Born

A course in which the individual student selects a topic for intensive study in the library and prepares a written report. Regular meetings for discussion. Credit according to work done, with a maximum of six hours.

Wd.Sc. 502. Research Projects in Weed Science
Wm. G. Corns and Wm. H. Vanden Born
Investigation of special problems involving field or laboratory study. Credit according to work done, with a maximum of six hours.
(See also Plant Science 356 and 357.)

SOIL SCIENCE

STAFF:
Professor and Head—J. A. Toogood.
Professor—C. F. Bentley.
Associate Professors—F. D. Cook, S. Pawluk, J. A. Robertson, G. R. Webster

Soils. 240. Introduction to Soil Science (3-3; 0-0)
J. A. Toogood and J. A. Robertson
Origin and classification of soil materials. Physical properties of mineral soils. Soil water and soil air in relation to plant growth.
Textbook: Buckman and Brady, *The Nature and Properties of Soils*, 6th Edition.

Soils. 250. Introduction to Soil Chemistry—J. A. Robertson (0-0; 3-3)
Chemical compositions of soils. Essential nutrients and soil fertility. Soil pH and its control. Nitrogen economy. C/N ratio. Organic matter in soil. Soluble salts in soils. Cropping systems.
Textbook: Buckman and Brady, *The Nature and Properties of Soils*, 6th Edition.
Prerequisite: Soil Science 240 or permission.

Soils. 420. Soil Classification—S. Pawluk (3-3; 0-0)
Soil genesis, morphology and classification with emphasis on Canadian interests. Soil survey reports, their interpretation and use. Proper use and conservation of Alberta soils.
Prerequisite: Soil Science 240 and 250, or permission.

Soils. 430. Soil Microbiology—F. D. Cook (0-0; 3-3)
Soil organisms and factors influencing their activity; the carbon, nitrogen, phosphorus and sulphur cycles; interactions between the soil microflora and herbicides, pesticides, etc; soil sterilization; the rhizosphere; the biological factor in soil genesis.
Prerequisite: Bacteriology 201 or Microbiology 360 or permission.

Soils. 450. Soil Colloids—G. R. Webster (3-3; 0-0)
Colloidal materials in the soil, both inorganic and organic. Mineralogy of clays. Chemical composition. Cation exchange. Amounts and activities of exchangeable ions. Flocculation. Oxides and hydroxides.
Prerequisites: Soil Science 240 and 250 or permission.

Soils. 460. Soil Fertility—J. A. Robertson and G. R. Webster (3-3; 0-0)
Sources of plant nutrients in the soil; nutrient availability as affected by soil conditions; soil colloids and ion exchange; fertilizer materials; methods of assessing soil fertility; soil fertility studies in Alberta and at other experimental stations.
Prerequisite: Soil Science 240 and 250 or permission.

Soils. 470. Irrigation and Drainage—S. Pawluk (3-3; 0-0)

Character of soil and water used for irrigation; methods of irrigation; measurement and distribution; duty; time and amount of application; removal of excess water; control of alkali; irrigation practices for various crops and soils; effects of fertility.
Textbook: Israelsen and Hansen, *Irrigation Principles and Practices.*
Prerequisite: Soil Science 240 and 250 or permission.

Soils. 501. Special Topics and Problems

A course in which the individual student is assigned a topic or problem for intensive study and prepares a written report. Regular meetings for discussion, and credits up to a maximum of six hours.

Soils. 520. Pedology—S. Pawluk (0-0; 3-3)

Systematics of soil classification throughout the world with special emphasis on distribution, morphology, and physical, chemical and mineralogical characteristics of soils as related to their genesis. Application of micro-pedological techniques to the study of soil fabrics. Use of aerial photographs for soil mapping purposes.
Prerequisite: Soil Science 420.

Soils. 521. Chemical Methods as Applied to Soil Research (3-3; 0-0)

G. R. Webster

A study of some of the more complex chemical reactions and properties of soil systems and the equipment and techniques used to study them.
Prerequisite: Soil Science 450, or permission.

Soils. 531. Physical Methods as Applied to Soil Research (0-0; 3-3)

J. A. Toogood

Physical properties of soils as they relate to mechanical composition, consistency, structure, aeration, tillage, erosion, and other factors affecting plant growth.
Textbook: L. D. Baver, *Soil Physics.*

Soils. 631. Seminar (1-0; 1-0)

Reports by students and instructors on the literature of selected topics, with class discussion. Required of all graduate students.

STATISTICS

Stat. 255. Elementary Statistics (3-3; 3-3)

Graphs, tables, diagrams. Frequency distributions, averages, dispersion, moments. Elementary probability. Binomial, normal and Poisson distributions. Sampling. Regression and correlation. Significance tests. Applications to data in various fields.
Prerequisite: Mathematics 30.

Stat. 305. Introductory Statistics (3-3; 0-0) or (0-0; 3-3)

Tabulation, graphical representation and reduction of data. Measures of location and dispersion. Elementary probability. Binomial and normal

distributions. Curve fitting and the chi-square test of goodness-of-fit. Elements of sampling. Testing statistical hypotheses, confidence intervals.

Prerequisite: Mathematics 30.

Stat. 450. Probability and Statistics (3-0; 3-0)

Theory of probability. Distribution functions and characteristic functions. Central limit theorem. Sampling. Exact sampling distributions. Confidence intervals. Maximum likelihood. Method of least squares. Analysis of variance. Statistical inference.

Prerequisite: Mathematics 304. (Previous completion of Statistics 255, or Biometrics 455 or equivalent, is advisable).

ZOOLOGY

Zool. 221. Elementary Zoology (2-3; 2-3)

VIII

The Faculty of Arts

INFORMATION, REGULATIONS, COURSES

OFFICERS OF THE FACULTY OF ARTS

Dean—D. E. Smith
Assistant Dean—W. A. S. Smith
Faculty Secretary—J. W. Fishbourne

Matriculation—Alberta Students

Students from high schools of Alberta seeking admission to the Faculty of Arts must present a high school diploma with "B" or higher standing in the following courses:

1. English 30
2. Social Studies 30
3. Mathematics 30
4. A language other than English (see below)
5. Physics 30 or Chemistry 30 or Biology 30 (or 32 up to and including 1965)
6. A second language (item 4) or a second science (item 5)

with an average of 60.0% in the required courses.

Notes on Matriculation Languages

The language other than English normally will be one of the languages taught in Alberta High Schools, i.e. French 30, Latin 30, or German 30. However, the Faculty will accept Greek, Italian, Russian or Spanish at an equivalent level.

If a second matriculation language is presented, it may be any of the languages mentioned in the preceding paragraph, or any other language (at an equivalent level) provided it is not from the same linguistic group as the first matriculation language. Students wishing to present a language not mentioned above should submit to the Dean's office evidence of their attainment in that language.

NOTE: In addition, candidates for the Bachelor of Music degree must present Grade VIII practical and Grade IV and V theoretical of the Western Board of Music.

Students whose matriculation credits were secured in 1954 or earlier are given full consideration; they are advised to forward to the Registrar complete transcripts of their high school records.

The requirement of a high school diploma may be waived for adult students.

These general regulations nothwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this right may be exercised in cases where applicants have written an inordinate number of examinations in order to obtain nominal entrance requirements.

Matriculation—Students from Outside Alberta

Students whose matriculation credits are secured outside Alberta are required to meet standards equivalent to those for Alberta students. They are advised to forward to the Registrar complete transcripts of their high school, or equivalent, records well in advance of the date for registration. A fee of five dollars is charged for evaluating

documents originating in Canada and ten dollars if issued in other countries. The University reserves the right to prescribe additional examinations in cases where doubt exists concerning matriculation.

Matriculation Deficiencies

Except as provided below, no student will be admitted to the Faculty of Arts with a deficiency in matriculation.

The University offers courses (usually numbered 100) at the grade XII level for students who are beginning their study of a particular subject. In certain circumstances, and only with the permission of the Dean, a student may take one such course to remove a matriculation deficiency, in which case it will not count towards a degree.

Promotion Regulations

Since students' fees cover less than one-quarter of the cost to the Province of their university education, the administration is in duty bound to ensure that only those students remain in the University who make effective use of its facilities. For this reason students' records are carefully reviewed from time to time, and those whose standing is unsatisfactory may be obliged to withdraw from the University.

Detailed regulations regarding promotion from one year to another are found in the general regulations for the honors programs, the general program and for the combined program for the B.A. and LL.B. degrees.

Faculty Regulations

Academic regulations governing students in the Faculty of Arts are contained in this section and in the general section of the Calendar. Regulations applicable to particular programs appear in the sections of the Calendar in which these programs are published. In addition, certain courses are subject to individual prerequisites.

Students are advised to read and consider carefully these regulations and, in cases of doubt as to the precise meaning of any statement or regulation, to consult the office of the Dean or the department concerned.

Limitation on Selection of Courses

Students registered in the Faculty of Arts must select their courses from those set out in the combined Calendar of the Faculties of Arts and Science. In rare instances, to meet special requirements, the Dean may make exceptions to this regulation.

Half-year Courses

A number of courses are offered in one term only; two such courses are recognized as the equivalent of one full course. Where the curriculum requires a full course in a particular subject or division, both courses must be chosen from that subject or division; where the requirement is for an option, any two half-courses may be combined to meet the requirement. Half-year courses are not open to first year students.

PROGRAMS OF STUDY

The Faculty of Arts offers honors programs and a general program leading to the degree of Bachelor of Arts (B.A.), and also programs in the Fine Arts leading to the degrees of Bachelor of Fine Arts (B.F.A.) and Bachelor of Music (B.Mus.). It is associated with the Faculty of Law in a program leading to the combined degrees of Bachelor of Arts and Bachelor of Laws (B.A., LL.B.).

Honors Programs

The honors programs lead to the B.A. degree, with honors in a particular subject or subjects, in four years. They are designed to provide specialization in the chosen subject or subjects together with a longer training than in the general program, as well as the higher standard implied by the term "honors". An honors program may be interrupted only by special permission of the Council of the Faculty.

Some departments provide a special first year for students who wish to take honors, although in most departments the difference between honors and the general program does not appear until the second year. Permission to take first year honors is granted to students with high matriculation standing and with the approval of the department concerned. A request for this privilege should be made on the Application for Admission or through the head of the department not later than the time of registration. A student who, in his first year, fails to attain the standard necessary for continuance in honors must transfer to the general program and subsequently must complete all its requirements. The special first year honors programs are so designed that a student can proceed to a degree in the general program without penalty.

A student need not commit himself to honors in his first year, and may register in an appropriate selection of courses as required by the regulations of the general program. If he obtains a sufficiently high standing in his first year and is recommended by the department concerned, he may enter honors in his second year. A student desiring to do so must apply to the Dean, through the head of the department concerned, preferably during his first year and in any case not later than the time of registration for the second year. Consideration will also be given to applications for transfer to honors submitted by students who have completed the second, or even the third, year of the general program.

Promotion from first year to second year, as well as from second to third and from third to fourth, is by recommendation of the department concerned, for which an average of at least 65% is required. A student who is not recommended to continue in honors at the end of his second year will be transferred to the general program, and must select his courses accordingly.

A student who is not recommended to continue in honors at the end of his third year, or who fails to complete the requirements for a degree with honors in his fourth year, may be granted the general degree forthwith, provided that the courses he has taken and the standing attained are satisfactory. Otherwise he may be required to take one or more additional courses in a subsequent summer or winter session. A student who, for any reason, is unable to return to university for the fourth year may apply for a general degree under the same conditions.

In all years a student's program must be approved by his department and by the Dean, and is subject to the following general provisions:

1. A student is not permitted to confine his studies to one discipline; during his first three years he must take at least three courses not closely related to his subject of specialization. For example a student specializing in the Social Sciences is obliged to take at least three courses in subjects classified as Humanities or Natural Sciences; similarly, a student in the Humanities must take at least three courses in the Natural or Social Sciences.
2. In the third and fourth years considerable latitude is permitted in order to meet the needs of individual students. A student may choose to concentrate

closely on one subject or to widen his field of study. In the latter case he will not be required to take, over the four years, more than ten courses in the subject of concentration.

3. The term "option", where it appears in the programs, is to be construed as a course freely chosen by the student provided he has the necessary prerequisite. An "approved option" is to be construed as an option approved by the department directing the program of the student concerned.

Degrees with honors are awarded in two classes, first class honors and honors. For first class honors an average of 80% is required; for honors, 65%. In awarding honors, the entire university record of the student may be considered.

The prescriptions for honors programs are listed with the offerings of individual departments.

THE GENERAL PROGRAM

Attention is directed to the regulation in Part I of this Calendar which makes every student responsible for the completeness and accuracy of his registration. This regulation will be strictly enforced.

No candidate for a Bachelor's degree in the Faculty of Arts will be recommended to the General Faculty Council for the award of the degree until three regular academic sessions, September to April, have elapsed after the date of registration in the first year.

Except by special permission of the Council of the Faculty, no student under its jurisdiction may offer for credit towards a degree in any period of twelve months, September 1 to August 31, more than five courses, either in the regular academic session or in both the regular and summer sessions. No student may take more than two courses in any one summer session, or in the evening credit program in any academic session, or more than three courses in any combination of these in a period of twelve months, September 1 to August 31.

A student proceeding to a Bachelor's degree in the Faculty of Arts will be required to complete a program of normal weight in at least one regular session, September to April. Exceptions may be made in the case of teachers who have at least two years' experience subsequent to receiving permanent teaching certificates. Such students may meet the requirements for the degree of Bachelor of Arts by attendance in the summer session and the evening credit program. They are warned that the University cannot undertake to offer in summer session and in the evenings all the courses required for the Bachelor of Fine Arts or Bachelor of Music degrees, or all the courses an individual may desire for the Bachelor of Arts degree.

To be granted the B.A. degree, a student must present passing marks or better in a minimum of fifteen full courses, and an average of at least 60 per cent in all courses credited towards the degree after the first year.

A student will not be allowed to write more than five supplemental examinations for the purpose of obtaining passing marks or of raising his average to the required 60 per cent. A student may not write more than two supplemental examinations in any year.

A student who is repeating a year will be granted no supplemental privileges in the courses taken that year, and must pass all courses with a 60 per cent average to be allowed to continue in the Faculty of Arts. The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in this Faculty, unless by special permission of the Dean.

Requirements for the B.A. in the General Program

First Year

English 200; an Arts course; a laboratory Science course; two options; Physical Education.

Second Year

An Arts course; a Science course; three options.

Third Year

An Arts course; a Science course; three options.

NOTES: 1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.

2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.A. degree must choose his principal subject of concentration in the humanities or in the social sciences.*
4. To be awarded the B.A., the student must present credit in at least eight courses in the humanities and social sciences.
5. Students should study the Advice to General Program Students, which appears under the departmental headings on subsequent pages of this Calendar, and should consult members of the departments offering the courses they choose.

---

*See notation under Details of Courses, "Mathematics".

Requirements for B.A. after B.Ed.

Students who have qualified for the degree of B.Ed. may proceed to the degree of B.A. if they have met the matriculation requirements of the Faculty of Arts and can present credit in thirteen Arts or Science courses. They will be required to complete six additional senior Arts or Science courses, as prescribed by the Faculty of Arts, and attain an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Arts will be required to remove any deficiencies; students with fewer than thirteen Arts or Science courses will be required to take additional courses.

Students who propose to secure the B.A. degree in this manner are advised to consult the Dean before registering in the Faculty of Arts.

Requirements for B.A. after B.Sc.

Students who have qualified for the degree of B.Sc. may proceed to the degree of B.A. by completing a 9-course program as prescribed by the Faculty of Arts and attaining an average of 60% in these courses.

Pre-Professional Requirements—Faculty of Medicine

Admission to the Faculty of Medicine is contingent upon the successful completion of two years of University study and the presentation of full university courses in organic chemistry, inorganic chemistry, physics and zoology. Students who register in the Faculty of Arts in order to meet these requirements should include in their programs Chemistry 230 and 350, Physics 100, 200 or 240 and Biology 230 or equivalent.

Combined Course Leading to the Degree of B.A. and LL.B.

First Year

English 200; French 200 or German 200 or Latin 200; a science or mathematics or statistics course; two of Economics 200, History 200, Philosophy 240 or Political Science 200; Physical Education.

Second Year

Five approved Arts courses (See "Notes" below.)
(No student may enter the second year of the combined course unless he has successfully completed the first with an average of not less than 60%.)

Third Year

The prescription for first year Law; one approved senior Arts course.
(Promotion from the second to the third year of the combined course is contingent upon an average of at least 60% in the second year and second class standing in at least four courses, two of which must be in the second year.)

Fourth Year

The prescription for second year Law.
(The degree of B.A. may be granted at the end of the fourth year.)

Fifth Year

The prescription for third year Law.

Notes on B.A.-LL.B. Course Selection

1. The courses of the first two years of the combined program must include a major concentration of three courses in one of Economics, English, History, Philosophy or Political Science, and a minor concentration of two courses in a second subject, not necessarily one of these.
2. The program must include at least one approved course in either Canadian History or Canadian Government, and at least one approved course in British Constitutional History or British Government; these courses may, but need not, be included in either the major or minor concentration.

Classification of Courses

Courses offered in the Faculties of Arts and Science are classified as follows:

Humanities

Art
Classics 350, 351, and 354
Comparative Literature
Drama
English
French
German
Greek
Hebrew (St. Stephen's College)
Household Economics 350
Italian
Latin
Linguistics
Music
Old and New Testament Literature
Polish
Russian
Scandinavian
Spanish
Ukrainian

Social Sciences

Anthropology
Classics 352, 353, 355, 356, 357 and 395
Christian Apologetics 366 (St. Joseph's College)
Economics
Education
Geography courses listed in the Arts section of the Calendar.
History
Philosophy
Political Science
Psychology courses listed in the Arts section of the Calendar
Sociology

Natural Sciences

Astronomy
Bacteriology
Biochemistry
Biology
Botany
Chemistry
Computing Science
Entomology
Genetics
Geography courses listed in the Science section of the Calendar.
Geology
Household Economics 210
Mathematics
Microbiology
Physical Science
Physics
Physiology
Plant Biochemistry and Physiology
Psychology courses listed in the Science section of the Calendar.
Statistics
Zoology

Courses numbered 100 to 299 inclusive, described as junior, are open to first-year students, and, in some circumstances, are also available as options in senior years. Courses numbered 300 to 499, described as senior, are primarily for students beyond the first year at University. Those numbered 500 or higher are open to honors and graduate students. For further information, particularly in the matter of prerequisites, students are advised to consult the section of the calendar containing detailed descriptions of courses.

A student shall restrict his first year registration to junior courses in five different subjects. Senior courses may be taken in the first year only with the consent of the department concerned and the approval of the Dean.

GRADUATE STUDIES

A student wishing to pursue work towards the Master's or Doctor's degree should consult the Calendar of the Faculty of Graduate Studies.

DETAILS OF COURSES

Notes: 1. Instructors are listed by departments. The rank in each case is that held in May, 1964.

2. The hours of instruction for both terms of the winter session are shown at the top of each course description. The letter "L" attached to a figure signifies lecture-laboratory hours, and the letter "s" seminar hours. The symbol 3/2 means three hours in alternate weeks. Unless otherwise specified, the first figure in each term indicates lecture hours and the second laboratory hours.

The University reserves the right to modify or withdraw for the session any of the courses here outlined.

ACCOUNTING

Instruction offered by members of the Faculty of Commerce.

200. Management Accounting (3-2; 3-2)

The language of accounting, forms of business organization and accounting implications, stressing managerial requirements.

Prerequisite: Permission of the Dean; open only to those B.A. and B.Sc. students taking Economics as a subject of concentration.

ANTHROPOLOGY

See Sociology and Anthropology

ART

See Fine Arts

CLASSICS

Associate Professors—R. J. Buck (Head), Margery W. Mackenzie, E .C. May
Assistant Professor—R. E. Braun
Lecturer—R. F. Kotre

Honors Programs

A statement will be found below of the general schemes of courses required to obtain honors in this Department. It is not implied that these schemes must be rigidly followed: the Department is prepared to discuss with prospective or actual students reasonable equivalents designed to meet special needs or desires of the persons concerned. In the courses dealing with the literary history, the economic and political history, and the private life of the classical peoples, oral examinations may at any time replace written tests.

Students must consult the Department before choosing their courses and obtain departmental approval before registering.

Honors in Classics

Programs in this field require at least five courses beyond the 100 level in the classical language chosen as a major; three or four courses beyond the 100 level in the classical language chosen as a minor; Classics 352 and 353 (Greek and Roman History); and eight or nine options, one of which must be a Science course which should be taken in the first year, for a total of twenty courses. Study of at least one year of French or German is strongly recommended. Some of the optional subjects will be integrated with the program, while others should be general options.

Honors in Classics, Ancient History and Classical Archaeology

Programs in these fields require at least four of Classics 352, 353, 354, 356, 395; three courses in Greek *plus* Greek 515 or 519; four courses in Latin; eight options, one of which must be a Science course in the first year, for a total of twenty courses.

Honors in Latin or Greek with an Approved Second Subject

A degree with Honors will be awarded in Latin or Greek with an approved second subject, such as English, French, German, Russian, Philosophy, etc.

Programs in these fields require at least five courses beyond the 100 level in Latin or Greek; at least four in the second subject; Classics 350 (Greek Life and Letters); Classics 351 (Latin Literature in Translation); *either* Classics 352 (Greek History), if the major language is Greek, *or* Classics 353 (Roman History), if the major language is Latin; and eight options, one of which must be a Science course which should be taken in the first year, for a total of twenty courses. Programs will be arranged in consultation with the other departments concerned.

Combined Honors (Latin and French, Latin and English, etc.)

A degree with Honors in Latin and French, Latin and English, Latin and German, Latin and Russian, or Greek and Philosophy may be awarded to students following a program of studies similar to the one outlined for Honors in Latin and Greek, except that the number of senior courses in each Honors subject will be as nearly equal as possible (normally five each) and will be selected in accordance with departmental requirements. Approval of both departments concerned is required before registration.

Advice to General Program Students

Both Greek and Latin may be begun at the University (Greek 100 and Latin 100). The course for students who enter the University with Latin 30 is normally Latin 200. From Greek 100 and Latin 100 a student proceeds in his second year to Greek 300 and, depending on his standing, to Latin 200 or Latin 300. From Latin 200, a student goes forward to either Latin 300 or one of Latin 373, 374, 375. It is possible for a general program student to take four courses in Latin and four in Greek.

General program students interested in combining a knowledge of the ancient world with a comparison of its cultures to modern civilization may form an area of concentration by making a selection from the courses offered by the Department in Early Civilization, Greek and Roman History, Ancient Art, and Greek and Latin Literature in translation.

LATIN

Junior Courses—

100. Beginners' Latin (5-0; 5-0)

This course is to enable students who enter the University without Latin to begin the study of this language in university. It is concerned with the essentials of grammar, syntax, the reading of easy Latin and prose composition. A secondary emphasis is placed on the connexion of English with Latin.

200. Latin Authors and Prose Composition (3-0; 3-0)

Hamilton and Carlyle, *Latin for Secondary Schools* (Gage); Wormald and Lyne, *Rogues' Gallery* (Cambridge); Vergil, *Aeneid,* Book IV (Sidgwick: Macmillan); Franklin and Bruce, *Latin Prose Composition* (Longman, Green and Co.).

For students with matriculation in Latin or with Latin 100.

Senior Courses—

300. Latin Authors and Prose Composition (3-0; 3-0)

A Latin Reader (Petrie: Oxford); *Latin Prose Composition* (Franklin and Bruce: Longman, Green and Co.). Sight translation and principles of language. For students proceeding from Latin 200 (2).

373. Horace, Tacitus and Juvenal (3-0; 3-0)
Horace, *Satires* (Palmer: Macmillan)
Tacitus, *Annals,* I-IV (Furneaux: Oxford).
Juvenal, *Satires* (Housman-Richards: Macmillan)

374. Cicero, Horace, Sallust (3-0; 3-0)
Cicero, *Pro Lege Manilia* (Wilkins: Macmillan).
Horace, *Odes* (Page: Macmillan).
Sallust, *Catilina,* (Nall: Macmillan).

375. Plautus, Terence, Vergil (3-0; 3-0)
Plautus, *Menaechmi* (Jones: Oxford).
Terence, *Adelphoe* (Ashmore; Macmillan).
Vergil, *Aeneid,* Book VI (Sidgwick: Macmillan).

Honors and Graduate Courses—

501. Cicero, Rhetorical Writings (3-0; 3-0)

502. Roman Comedy (3-0; 3-0)

504. Greek and Italic Dialects (3-0; 3-0)

505. Vergil, Complete Works (3-0; 3-0)

506. Sanskrit (3-0; 3-0)

507. Petronius, Apuleius (3-0; 3-0)

508. Tacitus (3-0; 3-0)

509. Tibullus, Propertius, Ovid (Amores)

510. Roman Satire (3-0; 3-0)

511. Advanced Latin Prose Composition (1-0; 1-0)

512. Writing of Latin Verse (1-0; 1-0)

517. Studies in Latin Literature (3-0; 3-0)

GREEK

Junior Courses—

100. Beginners' Greek (5-0; 5-0)
First Greek Book (White: Ginn); *A Greek Reader* (Colson: Macmillan).

Senior Courses—

300. Greek Authors and Prose Composition (3-0; 3-0)
A Greek Reader (Colson: Macmillan); Selections from *Homer's Iliad* (Benner: Appleton-Century); *Greek Prose Composition* (North and Hillard: Rivington).
Sight translation. Review of Greek forms. More difficult sentences for translation into Greek.

382. Thucydides, Euripides, Plato (3-0; 3-0)
Thucydides, Book I (Marchant: Macmillan); Euripides, *Medea* (Verrall: Macmillan); Plato, *Apology.*

383. Plato, Sophocles, Aristophanes (3-0; 3-0)

Plato, *Republic,* Books I-II (Adam: Cambridge); Sophocles, *Antigone* (Oxford Classical Text); Aristophanes, *Birds* (Stanford: Macmillan)

384. Aeschylus, Demosthenes, Thucydides (3-0; 3-0)

Honors and Graduate Courses—

501. Plato and Aristotle (3-0; 3-0)

502. Homer, Iliad (3-0; 3-0)

503. Pindar, Odes (Selections) (3-0; 3-0)

511. Advanced Greek Prose Composition (3-0; 3-0)

515. Greek and Latin Epigraphy and Palaeography (3-0; 3-0)

517. Studies in Greek Literature (3-0; 3-0)

519. Readings in Greek History (3-0; 3-0)

520. The Greek and Latin Epigram (3-0; 3-0)

NOTE: For graduate students only.

SURVEY COURSES IN THE LIFE AND THOUGHT OF THE ANCIENT WORLD

350. Classics in English (Greek) (3-0; 3-0)
Greek Life and Letters from Homer to Lucian

A study of life and thought in the Greek world for the period indicated. This will be based (a) on the literary documents, (b) on the department's collection of slides illustrating Greek art, architecture and natural environment. While a knowledge of Greek is highly desirable, it is not a prerequisite, as the literary documents are dealt with in translation.

This course is an option for second and third year students in Arts, Science, and other Faculties.

351. Classics in English (Latin) (3-0; 3-0)
Latin Literature from Ennius to Suetonius

A study of life and thought in the Roman world for the period indicated. While a knowledge of Latin is highly desirable, it is not a prerequisite, as the literary documents are dealt with in translation.

This course forms the natural sequence to Classics in English 350, with which it is closely related. It is an open option for second and third year students in Arts, Science, and other Faculties.

352. History of Ancient Greece: The Influence of the Greek Genius on the Western World (3-0; 3-0)

The story of the Hellenic world from its beginnings in the Minoan-Mycenaean civilizations of Crete and Greece until the time of Alexander the Great with special attention to the political organization of the city-state and the beginnings of democracy, and to cultural and economic development.

353. Roman History: The Roman Genius in the Mediterranean World (3-0; 3-0)

A study of the development of the Roman Republic and its expansion from

city-state to empire. Particular attention will be given to the Roman methods of organization, law and government, and to the way in which the Romans impressed their culture on the Mediterranean world and on Western Europe.

354. History of Ancient Art (3-0; 3-0)
A history of the rise and progress of ancient art from the Cretan period through the Graeco-Roman age. An examination of the aims and principles underlying ancient art. The course will be fully inllustrated from the depart-meint's collection of slides and photographs. This course is an open option for all students in the second and third years of the Faculties of Arts or Science.

355. Primitive Human Culture
A study of the origins and development of culture from early Quaternary times until the end of the Neolithic period.
(This course offered at Summer Session only.)

356. Early Civilization (3-0; 3-0)
The origin and development of human culture will be traced through the Palaeolithic, Mesolithic, Neolithic, Chalcolithic, Bronze and Iron Ages. Special attention will be given to Europe, the early civilizations of the Near East, Asia Minor and the Aegean.

357. Early Civilization
A study of the beginnings of civilizations in the Mediterranean world: Egypt, the Fertile Crescent, Crete and Greece, the Assyrian Empire.
(This course offered at Summer Sessions only.)

395. Prehistoric Archaeology (3-1; 3-1)
Archaeology as the anthropological approach to reconstruction and study of extinct, non-literate societies; archaeological techniques, methods and modes of interpretation; comparative analysis of the major prehistoric developments of the world.
Prerequisite: A course in Anthropology, or Classics 356, or consent of department.

COMPARATIVE LITERATURE

Instruction offered by members of the Departments of Classics, English, Germanic Languages and General Linguistics, Romance Languages and Slavonic Languages and Literature.

Before registering for these courses, students must consult the Interdepartmental Committee on Comparative Literature Studies, through one of the above departments, to ensure that they are qualified to undertake the work.

Honors and Graduate Courses—

503. Comparative Studies in European Drama of the Sixteenth and Seventeenth Centuries (3-0; 3-0)
Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

550. Comparative Studies in Romantic Literature (3-0; 3-0)
Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

555. Comparative Studies in Literature of the late Nineteenth Century (3-0; 3-0)

Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

620. Comparative Slavonic Literature (3-0; 3-0)

Prerequisite: Evidence of a competent reading knowledge of two Slavonic languages.

649. Franco-German Literary Relations during the Nineteenth Century (3-0; 3-0)

695. Anglo-German Literary Relations from the Sixteenth to the Nineteenth Century (3-0; 3-0)

DRAMA

See Fine Arts

ECONOMICS

Professors—W. D. Gainer (Head), E. J. Hanson, D. M. Oxnam (Visiting)

Associate Professors—M. F. Bauer, E. Berg, G. K. Goundrey, Z. Konczacki, I. Moravcik, T. L. Powrie, D. M. Winch

Assistant Professors—J. J. Delehanty, S. E. Drugge, W. Haque, C. A. Hedges

Sessional Lecturer—Rev. R. Pendergast

Honors in Economics

First Year

Economics 200, English 200, a laboratory science, two options to be selected with the advice of the department, Physical Education.

Second Year

Two courses in Economics, Statistics 255, two options to be chosen in consultation with the department.

Third and Fourth Years

Before entering the third year each student will arrange, in consultation with the department, a program of study and lectures to prepare himself for final comprehensive examinations. Unless they have been taken in the First and Second Years, the following courses are required: Two courses in foreign languages, preferably French or German or Russian (either two courses in one language or one in each of two languages); Accounting 200; Mathematics 200 or 201.

Students wishing to undertake a program of Slavonic and Soviet studies may register for Honors in Economics. By choosing his options according to the course requirements set out by an interdepartmental committee, a student may qualify to have the notation "Slavonic and Soviet Studies" added to his record upon satisfactory completion of his whole program.

NOTE: Students in the general course who elect the five-course sequence and who may wish to transfer to the Honors program should take Economics 300

and at least one of Economics 340 and Economics 380, as well as courses in Political Science, Mathematics, Statistics, Accounting and Modern Languages.

Advice to General Program Students

Students interested in Economics as a subject of concentration should take one of the following sequences:

Three course sequence: Economics 200 and two senior Economics courses;
Four course sequence: Economics 200 and three senior Economics courses;
Five course sqeuence: Economics 200 and four senior Economics courses.

Students who elect a five course sequence as a preparation for graduate studies in Economics should consult the Department.

Junior Courses—

200. Principles of Economics (3-0; 3-0)

A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy. Prerequisite for all senior Economics courses except 310, 311, and 330.

Senior Courses—

300. Micro-Economic Analysis (3-0; 3-0)

The theory of consumer behavior; price and output determination under competition, monopoly and other market structures; the allocation of resources and resource pricing; the distribution of income.
Prerequisite: Economics 200 or 302.
(NOTE: Not to be taken by students who have credit in Economics 301.)

301. Intermediate Economic Theory (3-0; 3-0)

Micro- and macro-economic analysis; the principles of price and output determination in product and factor markets; the theory of national income and product determination.
Prerequisite: Economics 200.
(NOTE Not to be taken by students who have credit in Economics 300 or 380.)

310. Canadian Economic Development (3-0; 3-0)

The relative growth of various industries and the regional distribution of economic activity with emphasis on the role of export staples, technology, capital accumulation and government.

311. Western European Economic Development (3-0; 3-0)

The development of the economy of Western Europe since the middle ages with emphasis on economic change in the United Kingdom, France and Germany.

320. International Economics (3-0; 3-0)

The basis of international trade, balance of payments problems, and related

matters are analyzed theoretically and in relation to questions of economic policy. The development of the international economy since 1500 is surveyed, with emphasis on events since the Second World War.
Prerequisite: Economics 200 or 302.

330. Labor Problems (3-0; 3-0)
A survey of the nature of labor economics and labor problems, including the various approaches of organized workers and employers to these problems. The approach of government to labor problems, including industrial disputes and social security. Applications of economic analysis to wages, unemployment and related problems.

340. Money and Banking (3-0; 3-0)
The principles of money, monetary systems, commercial banking, central banking, monetary theory and policy, foreign exchange.
Prerequisite: Economics 200 or 302.

350. Public Finance (3-0; 3-0)
A study of the conditions under which individual economic goals can be maximized through non-market mechanisms. Problems in the allocation of resources, redistribution of income, and stabilization of the level of resource utilization. A frame-work for analyzing taxes and the goals of a tax system. Patterns and trends in government expenditure and revenues. Objects, principles, and techniques of compensatory fiscal and debt policies. Special problems of interest to the class.
Prerequisite: Economics 200 or 302.

367. Agriculture in The Canadian Economy (3-0; 0-0)
The nature and scope of agricultural economics; size and organization of Canadian agriculture in relation to the economy as a whole; structure of the agricultural sector; technology and structural change within agriculture; economic growth, and policies for adjustment.
Prerequisite: Economics 200 or 302.

368. Agriculture in An International Setting (0-0; 3-0)
A survey of the world structure of agricultural production, consumption, and trade; international agricultural policies and agreements; impact of regional economic integration on agriculture; interrelation of economic development and trade in agricultural commodities.
Prerequisite: Economics 200 or 302.

372. Industrial Organization (3-0; 3-0)
An examination of problems arising from business concentration in an enterprise economy. Conflicting goals of public policies. Analysis of the behaviour and performance of firms in different market structures in Canada and the United States, to include such topics as problems in defining the market, types and importance of barriers to new competition, and determining the optimum level of competition. Common law foundations of public policies towards business concentration. Problems of interpreting, administering, and enforcing anti-combines legislation in selected cases. Special topics of interest to the class.
Prerequisite: Economics 200 or 302; Economics 300 recommended.

380. Macro-Economic Analysis (3-0; 3-0)

National income concepts and determination; the theory of aggregate consumption and investment; business cycle and growth applications of aggregate analysis.

Prerequisite: Economics 200 or 302.

(Note: Not to be taken by students who have credit in Economics 301.)

390. Comparative Economic Systems (3-0; 3-0)

A comparative study of the institutions and theories of important contemporary economies and systems of economic organization, with emphasis on the "mixed" capitalist system, "command" economies of the Soviet type, and transitional systems embodying socialist as well as capitalist principles. A survey of socialist economic thought with emphasis on the economics of Marx.

Prerequisite: Consent of department.

391. The Soviet Economy (3-0; 3-0)

The development and institutional arrangements of the Soviet economy; Marxian economics and Soviet economic policies; central planning of economic activity; Soviet economic performance and its evaluation.

400. History of Economic Theory (3-0; 3-0)

A survey of economic opinions and theories from ancient times to the present. Topics include the medieval just price, mercantilism, the Physiocrats, classical and Marxian economics, and the contributions of Marshall and Keynes. The emphasis is not on the detailed technical content of economic theories, but rather on the simplified essentials of theories and the relationship between economic thought and the social intellectual setting.

Prerequisite: Economics 200 or 302.

404. Introduction to Mathematical Economics and Econometrics (3-0; 3-0)

Simple mathematical models of micro- and macro-economic theory and statistical estimation of such models via cross section and time series analysis. The application of statistical methods, rather than their formal analysis, will be stressed.

Prerequisite: Economics 300 or 301 or 380.

410. Economics of Underdeveloped Countries (3-0; 3-0)

A survey of the economic conditions and problems of the under-developed countries of the world; the main economic characteristics of under-developed countries and the requirements of economic growth; measures for the economic development of low-income countries.

Prerequisite: Economics 200.

Honors and Graduate Courses—

501. Economic Analysis (3-0; 3-0)

Micro- and macro-economic analysis; price and distribution theory; aggregate consumption, investment and income determination.

Prerequisite: Economics 301.

502. A General Reading and Seminar Course (3s-0; 3s-0)

Required of all Honors and graduate students. A seminar in which theoretical and applied problems in economics will be discussed.

504. Econometrics (3s-0; 3s-0)

A study of the statistical concepts of probability, distributions, moments, and statistical inference as applied to economic problems. Estimation techniques and time series analysis of economic data.

Prerequisites: Economics 300 and 380; Statistics 255; Mathematics 200 or 201.

506. Mathematical Economics (3s-0; 3s-0)

A survey of mathematical models in economics. An analysis of linear and non-linear programming, game and decision theory, and Leontief systems.

Prerequisites: Economics 300 and 380; Statistics 255; Mathematics 200 or 201.

510. Economics of Underdeveloped Countries (3s-0; 3s-0)

An analysis of economic policy in under-developed countries; measurement of economic magnitudes; development of resources, roles of government and foreign aid; problems of planning.

511. Economic Development of Canada (3-0; 3-0)

560. Agriculture in Developing Countries (3-0; 3-0)

593. Seminar in Slavonic and Soviet Studies (3s-0; 3s-0)

An Interdepartmental Seminar

600. Advanced Micro-Economic Analysis (3s-0; 3s-0)

604. Advanced Econometrics and Mathematical Economics (3s-0; 3s-0)

611. Economic Development (3s-0; 3s-0)

621. International Economics (3s-0; 3s-0)

631. Labor Problems (3s-0; 3s-0)

641. Monetary Theory and Policy (3s-0; 3s-0)

651. Public Finance and Fiscal Policy (3s-0; 3s-0)

653. Transportation and Public Utilities (3s-0; 3s-0)

661. Agricultural Economics (3s-0; 3s-0)

663. Agricultural Marketing (3s-0; 3s-0)

671. Business and Government (3s-0; 3s-0)

680. Advanced Macro-Economic Analysis (3s-0; 3s-0)

691. Comparative Economic Systems (3s-0; 3s-0)

692. The Soviet Economy (3-0; 3-0)

EDUCATION

Instruction offered by members of the Divisions of Educational Psychology and Educational Foundations, in the Faculty of Education.

Ed Fdn 414. Sociology of the School (3-0; 3-0)

Study of the school as a social institution in the changing society.

Ed Psy 476. Educational Psychology (3-0; 3-0)

Individual differences; psychology of learning and forgetting; motivation; personality, adjustment, and mental hygiene; introduction to evaluation and the testing program.

Prerequisite: Ed. Psy. 276, Psychology 202, or equivalent.

Ed Fdn 492. Philosophy of Education (3-0; 3-0)

Philosophical bases of education, with particular reference to values, aims, curriculum, and the educative process.

Prerequisite: Philosophy 240 or 260 or 352 or 354 or 360.

Philosophy 242 or 246 or 356 may be submitted by Roman Catholic students.

ENGLISH

Professors—H. Kreisel (Head), R. G. Baldwin, A. T. Elder (Secretary of the Department), J. T. Jones, E. W. Mandel, A.A. Ryan

Associate Professors—J. W. Bilsland, J. F. Forrest, D. R. Godfrey, R. D. McMaster, E. J. Rose, I. C. Sowton, W .Watson, Alice G. White

Assistant Professors—R. F. Anderson, Diane E. Bessai, F. Bessai, D. F. Chapin, F. D. Clandfield, B. N. De Luna, Frances M. Frazer, E. G. Griffin, H. A. Hargreaves, Jean MacIntyre, G. S. McCaughey, R. D. M. Mathews, J. M. Nelson, J. Orrell, N. Parker-Jervis, A. H. Qureshi, Sheila Watson

Lecturers—H. E. Beissel, G. Samuel

Honors Program

Students wishing to read for Honors in English should consult the head of the department at the beginning of the first year. Students deciding during or at the end of the first year to undertake Honors in English must consult the head of the department at the earliest possible moment in order to ascertain whether their first-year courses and their standing in these courses are acceptable as a basis for admission to Honors at the beginning of the second year; and in cases where the first-year courses do not seem to provide an adequate basis, to discuss what extra work should be taken to rectify the situation.

First Year

English 200, French 200 or Latin 200 or German 200 or Italian 100 or, with permission, another language; an approved philosophy course; two approved options, one of which may be a second language.

Second Year

Three senior English courses; continuation of the first language; an approved option, provided that language requirements have been met*; English 501.

Third Year

Three senior English courses; two approved options, provided that language requirements have been met*; English 502. English 504 will be commenced in the spring of this year and continued throughout the fourth.

Fourth Year

Two senior English courses; two approved options, both of which may be senior English courses if language requirements have been met*; English 504 is to be continued and will count as a fifth course; English 503.

NOTE: Five of the senior English courses must be chosen to represent each of the following periods of literature: Old and Middle English, Renaissance, Seventeenth and Eighteenth Centuries, Nineteenth Century, Modern Period. At the discretion of the department, a student may take up to eleven full senior English courses. All courses are to be chosen in consultation with the head of the department.

---

*Language Requirements: A student who begins at University his first language (one chosen to satisfy the language requirement of the first year) must continue it for two more years. If the language of the first year is a language of matriculation, it need be continued for one year only. A student who begins at University a second language (one elected as an approved option) must continue it for one more year, unless specially exempted.

Advice to General Program Students

Students who choose English as a subject of concentration are advised to include in their programs a language other than English.

Junior Courses—

The English department offers two junior courses: English 200 and English 210. The first, English 200, is required of all candidates for the B.A. in the general program, but is open to students in other programs, especially those who wish to make English one of their subjects of concentration or are planning to take senior courses in English. The second, English 210, through accepted as a prerequisite for senior courses, is designed as a terminal course for students who do not expect to take further courses in English.

200. A Survey of English Literature from Chaucer to the Twentieth Century (3-0; 3-0)

A close study of representative masterpieces. Essays and tests of the prescribed literature will be given to afford practice in setting down ideas in good English.

Authors: Chaucer, More; Shakespeare, Jonson, Milton; Defoe, Pope, Swift; Wordsworth, Bronte, Tennyson, Browning; Yeats or Eliot, O'Casey or Shaw, Golding or Orwell. Other required reading: *Everyman* and appropriate selections of lyric verse.

210. English Language and Literature (3-0; 3-0)

English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Senior Courses—

NOTE: English 200 or 210 is a prerequisite for senior English courses.

308. Old English Language and Literature (3-0; 3-0)

An introduction to the language and literature of Anglo-Saxon England.

314. Middle English Literature (3-0; 3-0)
An introduction to some of the characteristic themes and forms of English literature between 1200 and 1500, excluding Chaucer and the Chaucerian tradition.

316. Chaucer (3-0; 3-0)
A study of the major works of Chaucer and of selected poets of the fifteenth century.

324. Nondramatic Literature of the English Renaissance (3-0; 3-0)
Representative prose and poetry, including selections from the works of More, Spenser, Sidney, Shakespeare, and Donne.

332. Shakespeare (3-0; 3-0)
A study of Shakespeare's development as a dramatist. Eighteen plays will be discussed, not all in great detail. Among them will be the following:—*The Comedy of Errors or Love's Labour's Lost, Richard III, Romeo and Juliet, Richard II, Henry IV,* Part I, *Henry IV,* Part II, *Henry V, Hamlet, Othello, King Lear, Macbeth, Antony and Cleopatra, The Tempest.*

340. Milton (3-0; 3-0)
A study of Milton's prose and poetry.

344. Seventeenth Century Poetry and Prose (3-0; 3-0)
The literature of the seventeenth century, studied in the light of intellectual developments of the period.

348. Restoration and Eighteenth Century Literature (3-0; 3-0)
Special study of representative works of Dryden, Swift, Pope, Addison, and Johnson, with additional reading in the drama, poetry, and prose of the period.

356. Poetry and Prose of the Romantic Period (3-0; 3-0)
Selections from Crabbe, Cowper, Burns, Blake, Burke, Wordsworth, Coleridge, Scott, Lamb, Hazlitt, De Quincey, Byron, Shelley, Keats.

364. Poetry of the Victorian Period (3-0; 3-0)
Selected works of Tennyson, Browning, Arnold, Clough, Fitzgerald, Rossetti, Morris, Meredith, F. Thompson, and Swinburne.

372. Currents of Thought in Victorian Prose Literature (3-0; 3-0)
Representative works by Burke, Carlyle, J. S. Mill, Newman, Arnold, Ruskin, Huxley, Butler, and Morris.

373. American Literature to 1900 (3-0; 3-0)
A selection of representative major writers to 1900. Emphasis is placed upon the writers of the "American Renaissance", especially Poe, Hawthorne, Emerson, Thoreau, Melville, Whitman, Mark Twain, and Henry James.
NOTE: Not to be taken by students with credit in English 394.

380. Early Twentieth Century (3-0; 3-0)
Representative plays by Shaw, Wilde, Galsworthy, Synge, O'Casey, Lawrence, T. S. Eliot, Auden. Representative novels by Bennett, Wells, Conrad, Forster, Lawrence, Joyce, Woolf, Huxley: Poetry, with particular attention to the work of Hopkins, Yeats, Eliot.

383. American Literature from 1900 (3-0; 3-0)
A selection of representative major writers from 1900 to the present.
NOTE: Not to be taken by students with credit in English 394.

384. Canadian Literature (3-0; 3-0)
A historical and critical study of the literature of English-speaking Canada.

388. The History of the English Language (3-0; 3-0)
A detailed analysis of the historical development of the English language, together with some study of its cultural and stylistic evolution, as reflected in the prose tradition from the Old English period to the present day. Some knowledge of French and Latin (or German) is recommended.

390. The Development of English Drama to 1800 (3-0; 3-0)
A historical and critical study of English drama from its beginnings to the end of the eighteenth century. The works examined will include specimens of mediaeval drama and plays by Marlowe, Jonson, Webster, Dryden, Congreve, Sheridan, and others.

392. The English Novel (3-0; 3-0)
Representative novels by Defoe, Richardson, Fielding, Smollett, Sterne, Goldsmith, Austen, Scott, Dickens, Thackeray, Trollope, Brontë, Eliot, Meredith, Hardy, and Forster.

393. The History of Literary Criticism (3-0; 3-0)
A survey of the major developments in literary criticism from Aristotle to the present time.

395. English Literature from the Late Eighteenth Century On (3-0; 3-0)
A close study of representative masterpieces.

396. Senior Course in English Composition (3-0; 3-0)
Before registering in this course, students must obtain the consent of the department, preferably at the end of the previous session. This course, which offers advanced training in composition, is intended for students who are fitting themselves to teach and for others who are interested in the study and practice of writing.

Honors and Graduate Courses—

500. Conference Course
Special work arranged for senior honors students.

501. Seminar, Second Year Honors English (1s-0; 1s-0)

502. Seminar, Third Year Honors English (1s-0; 1s-0)

503. Seminar, Fourth Year Honors English (1s-0; 1s-0)

504. Honors Tutorial
In the spring of his third year the honors English student, in consultation with the Department, will arrange for a literary project to be pursued under the guidance of a member of the Department for the ensuing summer and winter. The project will involve study of some problem having to do with such matters as technique, genre, criticism or theme. The course will be conducted as a tutorial.

552. Conference Course (3-0; 3-0)
(English 552 offers guidance in special reading courses in any field of English Literature. It is designed to fill in background studies for theses.)

560. Bibliography and Methods of Research (1-0; 1-0)

568. Literary Criticism (3-0; 3-0)
(Principles and History.)

576. Study of Language (2-0; 2-0)
(A synthesis of various approaches to the nature and use of language—historical, synchronic, comparative, philosophical, aesthetic.)

584. Advanced Course in Writing (3-0; 3-0)

588. Studies in American Literature (3-0; 3-0)

592. Old Norse and Germanic Philology (3-0; 3-0)

610. Old English (3-0; 3-0)

616. Chaucer and his Contemporaries (3-0; 3-0)

622. The Scottish Chaucerians and English Literature of the Fifteenth Century (3-0; 3-0)

628. Medieval Drama (3-0; 3-0)

634. Spenser and Donne (3-0; 3-0)

640. Shakespeare and his Contemporaries (3-0; 3-0)

646. Early Seventeenth Century Poetry and Prose (3-0; 3-0)

652. Milton (3-0; 3-0)

658. Eighteenth Century Prose (3-0; 3-0)

664. Studies in the Romantics (3-0; 3-0)

670. Currents of Thought in English Literature since 1790 (3-0; 3-0)

671. Studies in Victorian Poetry (3-0; 3-0)

672. Studies in the Victorian Novel (3-0; 3-0)

676. Studies in the Modern Novel (3-0; 3-0)

682. Studies in Twentieth Century Poetry (3-0; 3-0)

FINE ARTS

Professors—H. G. Glyde (Head), R. S. Eaton

Associate Professors—Violet Archer, F. F. Bueckert, A. B. Crighton, G. B. Peacock, T. Rolston, R. Stangeland, J. B. Taylor, E. N. Yates

Assistant Professors—C. T. Peacocke, B. Pragnell

ART

The Degree of Bachelor of Fine Arts (B.F.A.)
Drawing and Painting

First Year

English 200; a foreign language; Art 200; Art 230; Art 240; Physical Education.

Second Year

An Arts or Science option; an approved senior Arts course; Art 250; Art 300; Art 340.

Third Year

An Arts or Science option; Art 330; Art 350; Art 400 or 401; Art 440.

Fourth Year

Philosophy 350; a senior Arts or Science option; Art 430; Art 450; Art 474.

Advice to General Program Students

The Division of Art places no restrictions upon the choice of Art courses other than those imposed by prerequisite requirements and Faculty regulations.

Junior Courses—

200. Introduction to the History of Art (3-0; 3-0)
Beginning with a discussion of fundamental concepts underlying painting and the plastic arts, this course investigates the major styles and contributions of each important period.

230. Fundamentals of Design (1-4; 1-4)
The study and practical application of principles of composition and picture-making, methods of construction in design, and the use of conventional and abstract forms.

240. Fundamentals of Drawing (3-3; 3-3)
Theory and practice of drawing, analysis of masters' drawings; study of line, form, light and shade; portrait and figure construction; life drawing, using both long and quick poses.

250. Fundamentals of Painting (3-3; 3-3)
Theory and practice of painting in oils; forms in space; analysis of line and form in painting; study of arrangements, both two-dimensional and three-dimensional; use of light and shade; application of pigments in both monochrome and color.
Prerequisite: Art 240.

300. History of European Art, 3rd to 16th Century (3-0; 3-0)
A more detailed study of early Christian, Byzantine, Medieval and Renaissance periods of European Art.
Prerequisite: Art 200.

330. Advanced Composition I (2-3; 2-3)
Analysis of master compositions from the various schools of painting; theory and practice in arranging forms, both in the two-dimensional and in space; exercises in figure grouping; studies in non-figurative composition including an introduction to graphic design.
Prerequisite: Art 230 and Art 240, or consent of department.

340. Advanced Drawing I (2-3; 2-3)
Portrait and life drawing; drawing from memory and visualization; some anatomical drawing; designing from the figure and the draped model in terms of two-dimensional and three-dimensional form; techniques, line, brush, wash, etc.
Prerequisite: Art 240 or consent of department.

350. Advanced Painting I (2-3; 2-3)
Painting from the model; portrait, figure and costume. Life size painting chiefly in oils using sustained figure poses.
Prerequisite: Art 250.

400. European Art, 17th to 19th Century (3-0; 3-0)
A study of the French, Dutch, Spanish, German and English periods between the end of the 16th century and the end of the 19th century.
Prerequisite: Art 200.

401. Twentieth Century Art (3-0; 3-0)
The development of painting, sculpture and architecture from 19th century to present times.
Prerequisite: Art 200.

430. Advanced Composition II (3-3; 3-3)
Continuation of Advanced Composition I, including some graphics, painting techniques and plastic design.
Prerequisite: Art 330.

440. Advanced Drawing II (3-3; 3-3)
Continuation of Advanced Drawing I.
Prerequisite: Art 340.

450. Advanced Painting II (2-4; 2-4)
Painting from the model; portrait, figure and costume; lectures on painting techniques used by the masters of the Renaissance and modern schools; theory and practice of applying pigments on various grounds in both the direct and indirect methods.
Prerequisite: Art 350.

474. Advanced Drawing III (3-3; 3-3)
Continuation of Advanced Drawing II.
Prerequisite: Art 440.

MUSIC

The Degree of Bachelor of Music (B.Mus.)

Four separate programs lead to the degree of Bachelor of Music; these are Theory, Performance, Pedagogy, and Church Music. Students wishing to register in a B.Mus. program must have completed Grade VIII Practical and Grades IV and V Theoretical of the Western Board of Music, or equivalent. Matriculation requirements are otherwise as for the B.A. degree. Details of the programs are as follows:

Bachelor of Music in Theory

First Year

Music 203; Music 215; Music 225; Music 250; Music 260; English 200; Physical Education.

Second Year

Music 303; Music 315; Music 325; Music 353; Music 360; an Arts or Science course*.

Third Year

Music 403; Music 405; Music 415; Music 425; Music 453; Music 460; two Arts or Science courses*.

NOTE: Students majoring in Theory must complete the Grade X Practical examination of the Western Board of Music before graduating.

Bachelor of Music in Performance

First Year

Music 203; Music 215; Music 225; Music 250; English 200; Physical Education.

Second Year

Music 303; Music 315; Music 325; Music 353; an Arts or Science course*.

Third Year

Music 403; Music 405; Music 415; Music 425; Music 453; two Arts or Science courses*.

NOTE: During the first or second year a junior recital must be presented; a senior recital must be presented during the final year.

Bachelor of Music in Pedagogy

First Year

Music 203; Music 215; Music 225; Music 250; English 200; Physical Education.

Second Year

Music 303; Music 315; Music 325; Music 353; an Arts or Science course*.

Third Year

Music 403; Music 405; Music 415; Music 426; two Arts or Science courses*.

Bachelor of Music in Church Music

First Year

Music 200; Music 215; Music 225; Music 233; Music 250; English 200; Physical Education.

Second Year

Music 300; Music 315; Music 325; Music 333; Music 353; an Arts or Science course*.

Third Year

Music 405; Music 413; Music 415; Music 425; Music 433; two Arts or Science courses*.

NOTE: Students majoring in Church Music must select Organ as their First or Second Practical Subject and must complete the Grade XI (A.Mus. Solo Performer) examination of the Western Board of Music in their First Practical Subject and Grade VII in their Second Practical Subject.

---

*Each of the three Arts or Science courses must be selected from a department other than the Department of Fine Arts, and one of the three must be a senior course.

General Notes Regarding Bachelor of Music Programs

NOTE (i): First Practical Subject

The minimum practical grades of the Western Board of Music to be completed by the end of the final year of each of the four programs leading to the B.Mus. degree are as follows:

B.Mus. in Theory	— Grade X
B.Mus. in Performance	— Grade XI (A.Mus. Solo Performer Diploma)
B.Mus. in Pedagogy	— Grade XI (A.Mus. Teacher Diploma)
B.Mus. in Church Music	— Grade XI (A.Mus. Solo Performer Diploma)

All students in the above programs are required, at the completion of these programs, to have had three years of instruction in a First Practical Subject at University level.

Regardless of whether Grade XI of the Western Board of Music is completed prior to entrance into the B.Mus. programs or during the first or second years, the student must continue the study of the repertory of his instrument (Music 225, 325, 425 or 426) or in the case of the exceptional performer, proceed to the Licentiate of Music Diploma (L.Mus.) of the Western Board of Music.

Students, who, after three years of study do not meet the minimum requirements in their First Practical Subject in the final year of the above four programs, will not be granted their degrees. Those lacking this requirement will be allowed a time limit of two years in order to correct this deficiency, which is the student's responsibility.

NOTE (ii) Second Practical Subject

Students in the B.Mus. programs must select a Second Practical Subject for study; pianists in the Performance program should choose an orchestral instrument. In ALL programs, Grade VII of the Western Board of Music must be completed by the end of the third year.

NOTE (iii) B.Mus. Graduates Planning to Teach in Alberta Schools

The B.Mus. degree will be accepted by the Faculty of Education as equivalent to the B.A. provided that the holder of the B.Mus. presents at least four Arts or Science courses (the Arts courses from outside the Department of Fine Arts) two of which must be senior courses and one of the senior courses a sequent to a junior course.

Advice to General Program Students

The following sequences of courses are recommended to students choosing Music as a subject of concentration:

1. Music 200, 300, 400 or Music 250, 350, 450, in a three course sequence;
2. Music 200, 250 and two of 300, 350, 400, in a four course sequence;
3. Music 200, 250, 300 and two of 350, 400, 410 in a five course sequence.

100. An Introduction to Concert Music (3-0; 3-0)

An elementary course in the history and appreciation of concert music. Composers, styles and musical forms of the standard repertory will be studied. Attendance at prescribed concerts and rehearsals will be arranged.

No prerequisite.

Music 100 will *not* be accepted as a prerequisite for Music 200.

200. History of Music and Choral Technique (2-3; 2-3)

Elementary theory and practice of singing, choral technique and interpretation, sight singing and ear training. History of music. Introduction to form. Instruments of the orchestra. Assisgnments include one hour weekly of prescribed listening; records and scores are provided and the listening room is reserved at various times for small groups. Weekly reading will be assigned, part of it related to the listening.

Theory: The student will be required in March (of the session in which the course is taken), to pass an elementary examination in notation with 80% standing.

Prerequisite: (a) Western Board of Music Grade III theory or equivalent, *and*
(b) Western Board of Music Grade V practical or equivalent.

203. History of Music, Choral and Instrumental Techniques (2-6; 2-6)

Required of students in the first year of the Bachelor of Music program and open only to those students. The same content as Music 200 with the addition of a laboratory in the principles and practice of woodwind instruments.

210. Foundations of Music (2-3; 2-3)

The development of a musical repertory and knowledge of basic content appropriate for teachers. (Open to B.Ed. students lacking the prerequisite for Music 200; not to be used as a prerequisite in place of Music 200 for advanced courses in Music.)

Offered for the first time at the 1964 Summer Session.

215. Second Practical Subject (1-0; 1-0)

Required in the first year of the B.Mus. program.

225. First Practical Subject (2-0; 2-0)

Required in the first year of the B.Mus. program.

233. Hymnology (3-0; 3-0)

History of the hymn and hymn tune; types of hymns and their uses; analysis and interpretation of hymns; evaluation of standard hymnals.

250. Elementary Harmony and Counterpoint (2-3; 2-3)

Counterpoint up to three parts.

Diatonic harmony, including secondary sevenths. Modulation. Use of unessential notes of all kinds. Harmonizing of chorales in the style of Bach. Form; Ear training and Keyboard Harmony.

260. Theory Laboratory (0-1; 0-1)

Investigation of compositional styles and techniques. This laboratory is a co-requisite of Music 250 and is required of all B.Mus. Theory major students.

300. History of Music and Instrumental Technique (2-6; 2-6)

A study of the history of Music from the year 1600 to 1900. Scores and

records of music are provided. A critical evaluation of the styles of various composers is emphasized. The laboratory consists of the study of brass and woodwind instruments as applied to band and orchestral groups.
Prerequisite: Music 200 or equivalent.

303. History of Music and Instrumental Technique (2-6; 2-6)
Required of students in the second year of the Bachelor of Music program and open only to those students. The same content as Music 300 except that the instrumental laboratory is limited to stringed instruments.
Prerequisite: Music 203.

311. Band and Orchestra (2-3; 2-3)
Practical instruction in band instruments and in all matters relating to the formation, direction, and administration of the beginning band. This is an intensive course intended only for persons already competent in theoretical and practical music.
Instrumental studies will include tone production, fingering, and the embouchure of all brass and woodwind instruments. A survey of percussion instruments and their performance techniques. Care of band instruments. Conducting. A special study of clarinet, trumpet, trombone and rudimentary drumming.
(Offered at the Edmonton Summer Session Only.)

315. Second Practical Subject (1-0; 1-0)
Required in the second year of the B.Mus. program.

325. First Practical Subject (2-0; 2-0)
Required in the second year of the B.Mus. program.

333. Music in the Western Church (3-0; 3-0)
The nature of worship; music as an aid to worship; kinds of service music; orders of worship; congregational participation; responsibilities of director, organist, and choir; evaluating service music.

350. Harmony and Counterpoint (2-3; 2-3)
Counterpoint in three parts. Invertible counterpoint, canon and fugal exposition.
Chromatic harmony in four parts. Harmonic analysis; Ear Training and Keyboard Harmony.
Prerequisite: Music 250.

353. Harmony, Counterpoint and Orchestration (2-4; 2-4)
Open only to students in the second year of the Bachelor of Music program. The same content as Music 350 with the addition of a laboratory in orchestration.
Prerequisite: Music 250.

360. Theory Laboratory (0-1; 0-1)
A sequent course to Music 260 and a co-requisite of Music 353. Required of All B.Mus. Theory major students.

400. History of Music and Instrumental Technique (2-5; 2-5)
Styles and techniques of composers from Debussy to the present.
The laboratory includes the study of stringed instruments as applied to orchestral groups.
Prerequisite: Music 300 or equivalent.

403. History of Music and Instrumental Technique (2-5; 2-5)
Open only to students in the third year of the Bachelor of Music program. The same content as Music 400 except that the instrumental laboratory is limited to brass instruments.
Prerequisite: Music 303 or equivalent.

405. Acoustics of Music (1-0; 1-0)
A course in acoustics illustrating the basic principles of the science of sound and designed especially for musicians. This course is a requisite in the third year of the B.Mus. program.

410. Music of the Baroque (3-0; 3-0)
Study of styles, forms and literature of the Baroque Era (1600-1750).

412. Medieval and Renaissance (2-3; 2-3)
Music of the early Christian church. The mass, plainsong, the development of notation. The Troubadour movement. The development of polyphony through organum, clausula and motet. A study of composers' styles and techniques from Machaut to Palestrina.
Laboratory includes a weekly one-hour class in performance practices.
Prerequisite: Consent of department.

413. Medieval and Renaissance (2-5; 2-5)
Required of all students in the B.Mus. Church Music program. The same content as Music 412 with the addition of the instrumental laboratory of Music 400.
Prerequisite: Music 300.

415. Second Practical Subject (1-0; 1-0)
Required in the third year of the B.Mus. program.

425. First Practical Subject (Performance) (2-0; 2-0)
Required in the third year of the B.Mus. program by candidates in Performance.

426. First Practical Subject (Pedagogy) (2-0; 2-0)
Required in the third year of the B.Mus. program by candidates in Pedagogy.

433. Music of the Great Liturgies (3-0; 3-0)
Comparison of the Jewish, Eastern Orthodox, Catholic, Lutheran and Protestant Episcopal liturgies and their music; relation to music in the non-liturgical service; the church year.

450. Harmony and Counterpoint (2-3; 2-3)
Introduction to five-part harmony. Advanced chromatic harmony.
The study of 16th century counterpoint up to four parts.

Writing for various instruments; the setting of words. Keyboard harmony; score reading; analytical techniques; knowledge of standard musical works. Prerequisite: Music 350.

453. Harmony, Counterpoint and Orchestration (2-4; 2-4)
Open only to students in the third year of the Bachelor of Music program. The same content as Music 450 with the addition of a laboratory in orchestration.
Prerequisite: Music 353.

460. Composition (1-0; 1-0)
A sequent course to Music 360 and a co-requisite to Music 453. Required of all B.Mus. Theory major students.

510. Notation of Medieval Music (2-0; 2-0)
A study of the development of notation through the various schools of neume notation, Gregorian notation, Troubadour, early polyphonic, modal notation, the Franconian system and the period of Ars Nova. The transcription of facsimiles.

520. Notation of Renaissance Music (2-0; 2-0)
A sequent course to Music 510. Tablature and keyboard notation, proportional notation, white notation of the 15th and 16th centuries. The transcription of facsimiles.

DRAMA

Advice to General Program Students

For students choosing drama as an area of concentration, the following sequences are recommended:

1. Drama 250, 350 or 360, and a senior drama course (three course sequence).
2. Drama 250, 350, and two of Drama 300, 360, 400, 480 (four course sequence).
3. Drama 250, 350, 360, 480, and a senior drama course (five course sequence). Drama 480 should be taken in the final year.

250. Elementary Acting and Stagecraft (3-1; 3-1)
(a) Acting: Practical and theoretical through improvisation, stage performance and discussion. Emphasis is placed on the development of the actor through preparation for a role, acting scenes, and basic speech and body work. Elementary makeup.
(b) Practical work in acting and technical practice.

300. The History of the Theatre (3-0; 3-0)
Survey of theatrical and dramatic history from the Greeks to the middle of the nineteenth century. Extensive readings in the dramatic literature of the various periods.

350. Advanced Acting (2-4; 2-4)
(a) Further study and exercises in character creation, voice production, development of acting techniques.
(b) 1. Practical work in major productions and one-act plays.
2. Advanced training in contemporary styles of acting.
Prerequisite: Drama 250.

360. Voice and Speech (3-0; 3-0)

This is an introductory course in speech with emphasis upon oral interpretation. The first session will be devoted to a discussion of the importance of our spoken language, a study of the vocal mechanism and causes of poor phonation, and practice in the production of voice and speech. The second session will be concerned with the expression of personality through speech, audience psychology, oral interpretation and practice. Some reference will be made to other speech situations.

Before registering in this course, students must obtain the consent of the instructor.

400. The Modern Theatre (3-0; 3-0)

The development of the modern theatre from Ibsen to the present day. The aesthetics of the theatre. A considerable amount of outside reading will be assigned throughout the year, including the reading of plays and critical essays.

460. Playwriting (3-0; 3-0)

Study of and practice in playwriting. There will be an opportunity for production of a completed work.

Prerequisite: Drama 250 and English 200.

480. Directing Techniques (3-2; 3-2)

(a) A study of the problems of play selection, casting, preparation of a script and conduct of rehearsals; techniques involved in production.

(b) Practical

1. Each member of the class is given the opportunity to work with the director of a major production in a responsible capacity.
2. In the second term each member of the class will be responsible for the preparation of a complete director's script.

Prerequisite: Drama 250.

FRENCH

See Romance Languages and Literature

GENERAL LITERATURE AND CULTURE

Instruction offered by members of the Department of Classics and by the staff of St. Stephen's College.

351. Old and New Testament Literature (3-0; 3-0)

A study of the historical background, authorship, sources, literary qualities, and general teaching of the various books and groups of books in the Old Testament. A sketch of Jewish literature subsequent to the Old Testament canon; the Jewish and Hellenistic environment; the occasion, authorship and content of the various books of the New Testament; the growth of the canon; the history of the text.

350. and 351. Classics in English

See Department of Classics.

GEOGRAPHY

Instruction offered by members of the Department of Geography, in the Faculty of Science.

Honors Programs

The Department offers both the B.A. and the B.Sc. degrees with Honors in Geography. Students wishing to stress the humanities and social sciences should register in the B.A. program; those who wish to stress the physical and biological sciences should register in the B.Sc. program.

B.A. with Honors in Geography

First Year

Geography 201; English 200; two Arts options; Biology 130 or 230.

Second Year

Geography 300; Geography 301; either Geography 302 or 303; two approved options.

Third Year

Geography 400; one of Geography 302, 303, 401, 410, 416, 418 or 420; Zoology 321 and Botany 321; two approved senior options.

Fourth Year

Geography 502; one of Geography 402, 404, 406, 408, 412, 414 or 422; three approved senior options.

Students are required to have a reading knowledge of French or German. At the end of the fourth year a candidate for honors will be required to take an oral or written examination in the field of Geography.

Advice to General Program Students

Students interested in Geography as a subject of concentration may focus on courses leading to a B.A. or B.Sc. degree. In either case, the following sequences are recommended:

Three course sequence: Geography 201, 300 and one other senior Geography course.

Four course sequence: Geography 201, 300 and two other senior Geography courses.

Five course sequence: Geography 201, 300, 301, a regional course and one other senior Geography course.

Students interested in graduate work in Geography should consult the Department.

Note: Descriptions of Geography 201, 301 and other Geography courses considered to be Science courses will be found in the Calendar of the Faculty of Science.

200. General Geography (3-0; 3-0)

An introductory survey course covering various aspects of the field of geography, including physical, human, and regional.

Note: Geography 200 is generally considered a terminal course giving general coverage of the field.

300. Human Geography (3-0; 3-0)

The significance of human distribution on the earth. Man's relation to the physical environment; world population problems; cultural patterns in the world; aspects of political and economic geography in selected world trouble areas; racial geography and urban geography. Students planning on taking this course are strongly urged to precede it by Geography 201.

302. Economic Geography (3-0; 3-0)

A study of the distribution of economic activities over the world. Resources, industries, and trade patterns are reviewed systematically and in place.

400. Anglo-America (3-0; 3-0)

The regional geography of Canada and the United States. The physical framework of these countries and its significance in their historical development; the concept of the geographic region, the pattern and characteristics of these regions, with selected detailed studies.

Prerequisite: A previous course in geography, or consent of department.

402. Northern Lands (3-0; 3-0)

Exploration, physical and human characteristics, possibilities of development and settlement of Arctic and sub-Arctic regions. Special emphasis on Alaska, northern Canada, Greenland, and Scandinavia. A brief survey also will be made of Antarctica.

Prerequisite: A previous course in geography, or consent of department.

404. Europe (3-1s; 3-1s)

An introduction to the physical and historical geography of Europe, followed by the geographical characteristics of units within the continent. Seminar time will be devoted to selected detailed studies.

Prerequisite: Consent of the department.

406. Western Canada (3-0; 3-0)

A study of the resources, patterns of development and regions of Western Canada. The emphasis will be upon the developed parts of the Prairie Provinces and British Columbia.

Prerequisite: One of Geography 201, 300, 302 or consent of the department.

408. U.S.S.R. (3-0; 3-0)

The regional geography of the Soviet Union.

Prerequisite: Consent of the department.

410. Geography in Planning (2L-1s; 2L-1s)

This course will cover selected historical, theoretical and practical aspects of land use planning in various parts of the world. Physical and cultural aspects of planning projects and problems will be considered; techniques appraised.

Prerequisite: Consent of the department.

412. Latin America (3-0; 3-0)

A survey of the physical features of Middle and South America, followed by consideration of aboriginal peoples, settlement by the Europeans and a regional analysis of the individual countries.

Prerequisite: A course in geography, or consent of the department.

414. Africa (3-0; 3-0)

A general survey of the physical geography of the continent, its colonization and resources, followed by detailed regional studies.
Prerequisite: A course in geography, or consent of the department.

416. Industrial Geography (3-0; 3-0)

A systematic geography focussing attention on manufacturing and raw materials, transport, energy and markets in their areal context and in relation to manufacturing. Emphasis will be placed on geographic analysis of the character of representative manufacturing areas including major manufacturing regions as well as underdeveloped territories.
Prerequisite: Geography 302 or consent of department.

420. Political Geography (3-0; 3-0)

A study of the state area as a geographical phenomenon and as a causal factor in the nature and distribution of other features of geographical significance.
Prerequisite: A course in geography, or consent of the department.

422. Southwest Pacific (2-1s; 2-1s)

The geography of Australia, New Zealand and the islands of Oceania. Where appropriate special attention will be paid to the geographic implications of the social and economic problems of widely scattered dependent and underdeveloped territories and of the traditionally agricultural lands.
Prerequisite: A previous course in Geography or consent of department.

424. Resource Conservation (2-1s; 2-1s)

Principles of conservation of renewable resources and their application at the international, national and local levels. Student problems will be assigned.
Prerequisite: A previous course in Geography or consent of department.

500. History and Nature of Geography (1-2s; 1-2s)

Geography from ancient times to the present; the most important geographers and an assessment of their contributions; significant contemporary geographic concepts; current major developments within special branches of geography; geography in other countries.
Prerequisite: Consent of the department.

502. Reading and Seminar Course

504. Mediterranean Lands (3L-1s; 3L-1s)

A general survey of the geographical characteristics of those lands bordering the Mediterranean Sea will be followed by a series of more detailed studies for comparative purposes.
Prerequisite: Consent of the department.

506. Scandinavia (3-1s; 3-1s)

The regional geography of Norway, Sweden, Denmark, and Finland. Aspects of the historical, economic, and political geography of the area also will be included.
Prerequisite: Consent of the department.

508. Land Use Analysis and Planning **(1-2s; 1-2s)**

The geographic background to urban and regional developments; analysis of land use patterns and problems in urban and rural areas; use of this analysis in the preparation of urban and regional development plans.
Prerequisite: Geography 410 or consent of department.

510. Historical Geography **(1-2s; 1-2s)**

The development of historical geography and its relationship to geography and history: case studies of the geography of selected areas at given times in the past utilizing regional and topical approaches.
Prerequisite: A previous course in Geography or consent of department.

525. Field School in Geography

A survey of the geography of a selected region. Field studies for a week in September preceding registration, followed by the preparation of reports on specified topics. Reconnaissance and micro-studies employing geographical field techniques. Required of candidates for the Master's degree in Geography.

550. Research in Regional Geography

552. Research in Human Geography

553. Special problems

GERMANIC LANGUAGES AND GENERAL LINGUISTICS

Associate Professors—D. G. Mowat, E. Reinhold (Head), Alison Scott
Assistant Professors—I. Asmyte, J. Ellis, W. F. Klatte, G. Marahrens, G. N. O'Grady

GERMAN

Honors in German

A degree with Honors will be awarded in German with an approved second subject such as English, French, History, Latin, Linguistics, Russian, etc.

The program will require a maximum of eight courses in German, which must include German 510 in the fourth year, four to six in the second subject, and six to eight approved options, for a total of twenty courses. In addition, all Honors students will take in each year such laboratory hours as may be deemed necessary to improve their oral proficiency.

English 200 and a Science course must be included in the first year. History 322 and Linguistics 400 are to be included in the second and third years.

All programs will be arranged in consultation with the other departments concerned and departmental approval of the program is required before registration.

Combined Honors

A degree with Honors in German and English, German and French, German and Latin, German and Russian, may be awarded to students following a program of studies similar to the one outlined above, except that the number of senior courses in each subject will be as nearly as possible equal and selected in accordance with departmental requirements.

Advice to General Program Students

The following sequences are recommended to students choosing German as a subject of concentration:

1. For students beginning the language at the University: German 100 in the first year; German 200 and 320 in the second year; one or two of German 350, 370 *or* 380, 400 in the third year. Three courses may be taken in the third year if German 320 is not taken in the second.
2. For students entering with matriculation German: German 200 in the first year; one or two of German 350, 370 *or* 380, 400, in the second year; one or two of German 370 *or* 380, 390, 400, 450 in the third year.
3. German-speaking students and students beginning thir studies with more than matriculation German may be admitted to German 350 in their first year, provided they pass a Departmental placement test and obtain the permission of the Dean of Arts. In each of the second and third year they may take one or two of German 370, 380, 390, 400, 450, 510.

All courses from 370 on will be conducted in German.

100. Beginners' German (3-2; 3-2)

This course is designed to impart, on the introductory level, an active, practical skill in the use of the spoken and written word. The oral approach will be stressed, using material from everyday-life situations, easy cultural readers, slides, charts, maps, etc. The Department's language laboratory will be used for drill purposes and will also be available to students for individual practice.

200. First Year University German (3-1; 3-1)

This course is devoted to the development of the student's ability in speaking, reading and writing German, using modern short stories, cultural readers and audio-visual aids.

Prerequisite: German 30, German 100 or the equivalent.

210. Scientific German (3-0; 3-0)

This course will cover the elements of German grammar. It aims to give students a reading knowledge of easy scientific German. It is especially designed to meet the needs of honors students from science departments, students of the professional faculties and graduate students who require a knowledge of scientific German.

Note: Not open to general program students.

310. Advanced Scientific German (3-0; 3-0)

Reading of advanced scientific and technical texts, supplemented by a systematic and thorough discussion of grammatical difficulties and "trouble makers" in German scientific literature. The use of the dictionary. Analyzing compound words into their component parts. Technical terms. Abbreviations, reading of general texts and articles from major fields of science.

Students who pass German 310 with a mark of 65% or better will be considered by the Department as having fulfilled the reading reqiurement in German for the Ph.D.

Prerequisite: German 210 or 100 or their equivalent.

320. Second Year German Authors (3-0; 3-0)

Reading and study of selected German texts. Composition and conversation. Corequisite: German 200. Available only in the second year.

330. German Language and Culture (3-0; 3-0)

A study of German phonology, grammar and style. Lectures and assigned reading on German life, literature and civilization.
Prerequisite: German 200 or consent of the department.

350. Survey of German Literature (3-0; 3-0)

A general survey, a study of selected periods and of major works in German literature. A review of grammar, oral and composition work.
Prerequisite: German 200 or consent of the department.

370. German Literature of the Eighteenth Century (3-0; 3-0)

The historical and cultural background of the eighteenth century; Rationalism; *Sturm and Drang;* early Classicism. Texts include works of Lessing, Herder, Goethe and Schiller. Foreign influences on German Literature. Lectures, discussions and reports; composition and oral work.
Prerequisite: German 200 or consent of the department.

380. The Age of Goethe (3-0; 3-0)

German Classicism and Romanticism; the works af Goethe, Schiller, Novalis, Hölderlin, and Kleist. Special emphasis is placed on the interpretation of the works of Goethe. Lectures, discussions and reports; composition and oral work.
Prerequisite: German 200 or consent of the department.

390. History of the German Language (3-0; 3-0)

An historical survey of the major periods of the German language. Foreign influences on German style and vocabulary. The relationships between language, history and literature.
Prerequisite: One senior German course or consent of the department.

400. German Literature of the Nineteenth Century (3-0; 3-0)

This course consists of a study of the leading exponents of nineteenth century drama, fiction and poetry, including the background of Romanticism, of the Young Germany Movement, of Realism, and of Naturalism. A careful study is made of the characteristic qualities of the writers and their contributions to German literature. Lectures, discussions and individual reports.
Prerequisite: German 200 or consent of the department.

450. Modern German Literature (3-0; 3-0)

The important literary movement since Naturalism (Impressionism, Expressionism, contemporary literature) will be studied, using a number of representative authors of each period. Interpretation of poems, dramas, *Novellen,* and novels. Lectures, discussions and individual reports.
Prerequisite: One senior German course or consent of the department.

Honors and Graduate Courses—

Before registering for these courses, students must consult the Department to ensure that they are qualified to undertake the work.

500. Special Reading Course (3-0; 3-0)

Specifically designed for graduate students who wish to prepare themselves for the Ph.D. language requirement in German. The course consists of an intensive study of essential grammar, reading of graded texts and translation of texts selected from the students' own fields. Conducted on a tutorial basis.

Graduates who obtain a mark of 65% or better will be considered by the Department as having fulfilled the reading requirement in German for the Ph.D.

Not open to undergraduates.

502. Practical Study of the German Language (0-1; 0-1)

Second year honors laboratory hour.

503. Practical Study of the German Language (0-1; 0-1)

Third year honors laboratory hour.

504. Practical Study of the German Language (0-1; 0-1)

Fourth year honors laboratory hour.

510. Advanced German Composition (2-0; 2-0)

This course is designed to enable students to read the German language fluently and intelligently, to write it correctly and idiomatically, to understand it as a spoken language and to speak it with facility. The work consists of conversation and exercises in composition relating to topics of general interest; reading of difficult literary material; discussion of problems of German grammer; drill in pronunciation and intonation; building of the German vocabulary.

Required of all students taking honors and majoring in German.

530. Middle High German Literature and Philology (3-0; 3-0)

Prerequisite: One senior German course.

540. Old High German (3-0; 0-0)

Prerequisite: Two senior German courses.

550. Gothic (3-0; 0-0)

560. History of the German Language (3-0; 0-0)

575. Studies in Indo-European (3-0; 0-0)

580. Comparative German Grammar (0-0; 3-0)

590. Old Saxon (0-0; 0-3)

595. Bibliography and Methodology (2-0; 2-0)

600. An Introduction to the Study of Lyric Poetry: Goethe's Poems (3-0; 3-0)

603. German Poetry from the Twelfth to the Nineteenth Century

606. The Development of the German Drama (3-0; 3-0)

609. Development of the German Novelle with Emphasis on the Nineteenth Century (3-0; 3-0)

612. The German Roman from Johann Fischart to Jakob Wassermann (3-0; 3-0)

615. History of German Literature to the Age of Goethe (3-0; 3-0)

630. Lessing and the Period of Enlightenment (3-0; 3-0)

640. Goethe's Faust and the Faust Legend (3-0; 3-0)

650. Schiller's Historical Dramas (3-0; 3-0)

660. Heinrich Heine and the Young Germany Movement (3-0; 3-0)

670. The German Drama of the Nineteenth Century (3-0; 3-0)

680. The Life and Works of Gerhart Hauptmann (3-0; 3-0)

690. Contemporary German Poetry (3-0; 3-0)

697. Special Topics in Germanic Linguistics and Philology (3-0; 3-0)

698. Special Topics in German Literature (3-0; 3-0)

699. Conference Course

An honors or graduate course designed to meet the needs of indivdual students. It may include the detailed study of an author, period, genre, or any literary problem not dealt with in the honors or graduate courses listed above.

SCANDINAVIAN

100. Elementary Norwegian (3-2; 3-2)

A first course in *bokmal* (*riksmal*). The oral approach, using the language laboratory, will be stressed, followed by reading of easy literary and cultural material.

300. Second Year Norwegian (3-1; 3-1)

Reading and study of selected texts in Norwegian literature and culture. Composition and conversation.
Prerequisite: Norwegian 100

350. Modern Scandinavian Literature in English (3-0; 3-0)

A study of representative works by Scandinavian writers from the late nineteenth century to the present, including Ibsen, Strindberg, Lagerkvist, Lagerhof, J. P. Jacobsen and others.

550. Old Icelandic Philology (3-0; 3-0)

GENERAL LINGUISTICS

Advice to General Program Students

Students choosing Linguistics as a subject of concentration are recommended to take the following sequences:

Three course sequence: Linguistics 350 and two other courses in Linguistics.

Four course sequence: Linguistics 350, Linguistics 455 and two other courses in Linguistics.

Five course sequence: Linguistics 350, Linguistics 455 and three other courses in Linguistics.

Senior Courses—

305. Culture and Language (3-0; 3-0)

An inquiry into the nature of human communication, its cultural conditions and consequences. Special attention will be given to the interrelations of the linguistic structures and habitual modes of behaviour and thought of various societies.

350. General Linguistics (3-0; 3-0)

An introduction to and a survey of the field of language and languages dealing with the fundamentals of structural and historical linguistics. Topics discussed include language families, types of languages, linguistic change, linguistic structure. Emphasis will be placed on modern European languages.

370. Contrastive Linguistics (3-0; 3-0)

An analytical study of the French and English languages, comparing and contrasting their linguistic structure, i.e. phonetics, phonemics, morphology, syntactical patterns and lexicology. Practical work in oral recognition and phonetic transcription.

Prerequisite: French 200

387. Linguistic Geography (3-0; 3-0)

An introduction to the dialect geography of American and Canadian English, with work on materials from Alberta and elsewhere.

Prerequisite: English 200 or equivalent.

(Note: Equivalent to the Summer Session course English 387).

405. Applied Linguistics (3-0; 3-0)

The application of structural linguistics to second language learning, and its relationship to various ancillary areas.

Prerequisite: Linguistics 350.

455. Descriptive Linguistics (3-0; 3-0)

Methods of analysing and describing linguistic structure. Problems from a variety of languages, including the indigenous languages of North America.

Prerequisite: Linguistics 350.

465. Historical Linguistics (3-0; 3-0)

A study of linguistic change. Methods of reconstruction of earlier stages of language through the comparison of existing languages and through the examination of written records. Genealogical and typological bases for classifying languages. Particular emphasis will be placed on the Indo-European language family.

Prerequisite: Linguistics 350.

470. American Indian Linguistics (3-0; 3-0)

A survey of indigenous languages of North America, with special reference to those spoken in Western Canada. A study of the distribution and structural characteristics of these languages, supplemented by laboratory work involving analysis of an American Indian language, using a native speaker as informant.

Prerequisite: Linguistics 350.

550. Advanced Phonetics and Field Methods (3-0; 3-0)
Phonetic theory; practical phonetics; recording techniques and methods of analysis illustrated by the study of an American Indian language or Eskimo. Native informants and recorded material will be used.
Prerequisite: Linguistics 455.

699. Conference Course
An honors or graduate course designed to meet the needs of individual students.

GREEK

See Classics

HISTORY

Professors—L. G. Thomas, F. D. Blackley, J. G. Rayback
Visiting Professor—W. C. Hartel
Associate Professors—L. Hertzman, G. A. Rothrock, L. H. Thomas, D. L. Wiedner (Chairman)
Assistant Professors—F. de Luna, R. C. Elwood, B. L. Evans, B. J. Fraser, W. B. D. Heeney, W. J. Jones, M. Katz, M. LaTerreur, H. P. G. Liebel, J. N. Wickenden
Sessional Lecturers—L. Al Karmy, J. Pinnington, G. Stelter

Honors in History

Students proposing to read for Honors in History, whether at the time of first registration or while registered in the general course, should consult the Head of the Department.

The degree of Bachelor of Arts with Honors in History is awarded on the following basis:

(1) Comprehensive examinations written at the end of the fourth year in three fields of historical study:

One of British Medieval	(History 511)
British Modern	(History 512)
One of Canadian	(History 513)
American	(History 514)
One of Medieval European	(History 515)
European, 1500-1789	(History 516)
European, 1789-1939	(History 517)

Candidates may not present both the British and European medieval fields.

(2) Examinations, oral and written, at the end of the fourth year, in a special historical subject chosen by the student not later than the beginning of his third year (History 500 and 501). The candidate in addition will be required to write a minor thesis utilizing primary source material.

(3) Satisfactory completion of approved courses in two other fields of study chosen in consultation with the Head of the Department, e.g. English, Philosophy, Political Science, a second language. At least two courses must be taken during a student's undergraduate program in each of the two fields chosen.

(4) Proof of ability to read a modern language other than English.

Students wishing to undertake a program of Slavonic and Soviet studies may register for Honors in History. By choosing his options according to the course requirements set out by an interdepartmental committee, a student may qualify to have the notation "Slavonic and Soviet Studies" added to his record upon satisfactory completion of his whole program.

Normally Honors students in History take five courses a year. In their third year they will take History courses numbered in the 400's. They are expected to pursue a course of reading during the summers. This is arranged with the Department in connection with preparation for the comprehensive papers and the special subject. In their fourth year they normally will be enrolled in the appropriate History courses (Comprehensive) for the fields that they have chosen in consultation with the Head of the History Department.

Advice to General Program Students

Students who select history as a subject of concentration are advised to take either History 200 or History 201 in their first year. However students may, except when a prerequisite is specifically indicated, take the courses in the 300 range in the second or third year without a previous course in history. Students in the third year should choose a course in the 400 range only if they have taken at least two previous courses in history, though exceptions may be made in the case of students with special interests and an adequate background in other disciplines.

Junior Courses—

200. European History (3-1s; 3-1s)
The history of Europe from the decline of the Roman Empire in the West to the present.

201. European History (3-1s; 3-1s)
European Civilization since the Renaissance.
(Not offered, 1964-65).

Senior Courses—

300. Medieval Europe (3-0; 3-0)
The rise and development of medieval institutions.

302. Europe 1050-1453 (3-0; 3-0)
The formation and expansion of Christian Europe.
Prerequisite: a previous course in history or the consent of the instructor.

304. Europe, 1453-1648 (3-0; 3-0)
Europe in the age of the Renaissance and Reformation.

306. Europe, 1648-1815 (3-0; 3-0)
European history from the Treaties of Westphalia to the downfall of Napoleon

308. European History since 1815 (3-0; 3-0)

320. France (3-0; 3-0)

322. Germany since 1648 (3-0; 3-0)

324. Russia (3-0; 3-0)
The political and social development of Russia, with emphasis on the period since 1861.

350. British History (3-0; 3-0)
A survey of the history of the British Isles.

352. The British Empire and Commonwealth (3-0; 3-0)
A survey of the history of the British Empire and the Commonwealth.

360. The United States, 1492-1941 (3-0; 3-0)

370. Canada (3-0; 3-0)
A survey of the political and social history of Canada.
Prerequisite: a previous course in history or the consent of the department.

380. The Far East (3-0; 3-0)

The following courses are open to third-year, honors, and graduate students. Prerequisites are at least two previous courses in history or the consent of the department. Specific requirements are as shown.

400. A Selected Topic from the History of Medieval Europe, 1200-1500 (3-0; 3-0)

404. A Selected Topic from the Period of the Renaissance or the Reformation (3-0; 3-0)

405. Social and Economic History of Europe (3-0; 3-0)

406. The French Revolution (0-0; 3-0) or (3-0; 0-0)

407. The Era of Napoleon (3-0; 0-0) or (0-0; 3-0)

420. A Selected Topic from the History of France (0-0; 3-0) or (3-0; 0-0)

422. The Social Thought of Nineteenth Century Europe (0-0; 3-0) or (3-0; 0-0)

423. The Politics of Weimar Germany (3-0; 0-0) or (0-0; 3-0)

424. The History of the Communist Party in Russia (0-0; 3-0) or (3-0; 0-0)

426. The Intellectural History of Russia since 1762 (3-0; 3-0)

428. The History of Czechoslovakia and Poland (3-0; 3-0)

430. The History of Ideas in Europe, 1300-1815 (3-0; 3-0)
Prerequisite: Consent of the Department.

450. English Constitutional History (3-0; 3-0)
Prerequisite: History 350.

451. English Medieval History (3-0; 3-0)

452. Tudor and Stuart England (3-0; 3-0)

453. Britain Since 1714 (3-0; 3-0)

454. English Society in the Nineteenth Century (3-0; 3-0)

460. The United States in the Nineteenth Century (3-0; 3-0)

463. Early American History to 1789 (3-0; 3-0)

470. The History of the Canadian West to 1870 (0-0; 3-0) or (3-0; 0-0)

471. The History of the Canadian West since 1870 (3-0; 0-0) or (0-0; 3-0)

472. The History of Canada to 1791 (0-0; 3-0) or (3-0; 0-0)
Prerequisite: A reading knowledge of French.

474. Problems of Canadian Confederation 1867-1900 (3-0; 0-0) or (0-0; 3-0)

480. East Asia (3-0; 3-0)

485. Africa (3-0; 3-0)

490. Latin America (3-0; 3-0)

492. The Middle East (3-0; 3-0)

Honors and Graduate Courses—

500. Special Subject—Third Year, Honors History (3-0; 3-0)
and

501. Special Subject—Fourth year, Honors History (3-0; 3-0)
Not later than the beginning of his third year the Honors student in consultation with the Department will select a special subject to be studied under the guidance of a member of the Department for the ensuing two years. He will have weekly conferences with his instructor and will be assigned written work including a minor thesis utilizing primary source materials. Special subjects are offered by most members of the Department. The following are a few *examples* of possible special subjects.

1. Chaucer's England
2. France in the Age of Louis XIV
3. Elizabethan England and its Aftermath
4. Russia since 1861
5. Southern Africa in the 19th century
6. Society in New France

511. British Medieval History (Comprehensive) (3-0; 3-0)

512. British Modern History (Comprehensive) (3-0; 3-0)

513. Canadian History (Comprehensive) (3-0; 3-0)

514. American History (Comprehensive) (3-0; 3-0)

515. Medieval European History (Comprehensive) (3-0; 3-0)

516. European History, 1500-1789 (Comprehensive) (3-0; 3-0)

517. European History, 1789-1939 (Comprehensive) (3-0; 3-0)

518. Slavonic and Soviet Studies: an interdepartmental seminar (3-0; 3-0)

600. Conference Course
Directed study in special subjects to meet individual requirements.

602. Philosophy of History and Historiography (3-0; 3-0)

605. Research Seminar (3-0; 0-0) or (0-0; 3-0)

620. Topics in Medieval European History (3-0; 3-0)

624. England in the Late Middle Ages (3-0; 3-0)

628. The Age of the Reformation (3-0; 3-0)

631. European Intellectual History since 1500 (3-0; 3-0)

635. Europe from 1715 to 1815 (3-0; 3-0)

642. Germany since 1815 (3-0; 3-0)

648. Russia in the Nineteenth Century (3-0; 3-0)

651. Tudor and Stuart England (3-0; 3-0)

655. Britain in the Nineteenth Century (3-0; 3-0)

661. Canada to 1791 (3-0; 3-0)

665. Canada since 1841 (3-0; 3-0)

668. Western Canada (3-0; 3-0)

674. The United States in the Nineteenth Century (3-0; 3-0)

681. Africa South of the Sahara (3-0; 3-0)

689. Western Diplomacy in Eastern Asia, 1850-1950 (3-0; 3-0)

HOUSEHOLD ECONOMICS

Instruction offered by members of the School of Household Economics.

350. Applied Art (3-3; 3-3)

A study of the principles of design and the theory of color. Creative problems including block printing, stencilling, stitchery, and other techniques. Historic styles of architecture and furniture and their relation to modern design. The planning of a contemporary house and its furnishings.

NOTE: One of Household Economics 210 and Household Economics 350 may be taken for degree credit.

ITALIAN

See Romance Languages

LATIN

See Classics

LINGUISTICS

See Germanic Languages and General Linguistics

MATHEMATICS

Either the B.A. or B.Sc. degree may be taken with Mathematics as the principal subject of concentration. Students wishing the B.A. degree should consult the Department of Mathematics concerning a suitable sequence of courses.

B.A. Honors in Mathematics

First Year

Mathematics 206 and 271; English 200; one Arts option; one option; Physical Education.

Second Year

Mathematics 306 and 360; two Arts options; one option.

Third Year

Mathematics 308 and either 424 or 309; Mathematics 425; two senior Arts options; one senior option.

Fourth Year

Mathematics 426 and 502; one of Mathematics 421, Mathematics 423 or Statistics 455; two senior Arts options; one senior option.

NOTE: (1) The program must be approved by the Department of Mathematics.

(2) The Department offers both the B.A. and the B.Sc. degrees with honors in Mathematics.

(3) A list of mathematics courses, together with their descriptions, appears in the Faculty of Science calendar.

MUSIC

See Fine Arts

PHILOSOPHY

Professor—A. M. Mardiros (Head)
Associate Professor—H. Tennessen
Assistant Professors—E. W. Kemp, J. Malcolm, D. M. Murray, G. Price, H. R. G. Schwyzer, C. T. J. Williamson
Lecturer—R. Bosley
Staff of Affiliated College—Father Dore

Honors Programs

Degrees with Honors from this Department will fall into these groups:

(1) B.A. with Honors in Philosophy and an approved minor subject;
(2) B.A. with Honors in Philosophy and Greek.

Students are advised to consult the Department for information before choosing one of the groups, and in any case, Departmental approval of the final program of studies is required before registration. In the case of students under (2), the program will be arranged in consultation with the Department of Classics and the Department of Philosophy.

Honors in Philosophy will require nine courses in Philosophy. Four in a minor subject, or an integrated selection of five or six courses in a group of subjects, will also be required. This part of the program will be closely related to the student's special interests within the field of philosophy. Optional courses outside the fields of philosophy and the minor will complete the program.

Honors in Philosophy and Greek will follow the requirements of Honors in Philosophy, with some reduction in the number of Philosophy courses in order to increase the number of Greek courses beyond the requirements for a minor subject.

In addition to final examinations in courses prescribed, students in the final year of both groups will be required to write two comprehensive examinations, one of which may take the form of an essay paper.

Advice to General Program Students

The Department of Philosophy places no restrictions upon the choice of philosophy courses other than those imposed by prerequisite requirements and Faculty regulations.

Junior Courses—

240. Introduction to Western Philosophy (3-0; 3-0)

This course is designed to introduce the student to the main problems and theories that have dominated philosophical thought in the Western world, through the study and discussion of selected philosophical classics. Emphasis will be placed both upon a sound acquaintance with the main outlines of our philosophical tradition and upon the ability to handle philosophical ideas independently. To this end both lectures and discussions will form part of the student's training.

242. Foundations and Development of Christian Philosophy (3-0; 3-0)

A study of the ideas and main currents of Western Philosophy from its beginnings in the creative period of Greek thought, to achieve an appreciation of the historical roots of our civilization. Selected ideas and problems will be examined in the writing of significant contributors to this development. Lectures and discussion.

(Note: This course is offered by St. Joseph's College and is accepted as an alternative to Phil. 240)

260. Introduction to Logic, Semantics and Scientific Method (3-0; 3-0)

This course introduces the student to the theory and practice of interpretation and definition, precise argumentation, objective judgement and rational decision making, with a brief elementary introduction to symbolic logic.
Its general purpose is to show how to distinguish between sound and unsound beliefs and thus to serve as an introduction to philosophic method.

Senior Courses—

340. Greek Philosophy (3-0; 3-0)

Prerequisite: Philosophy 240.

342. Philosophy from Descartes to Kant (3-0; 3-0)

Prerequisite: Phil. 240.

344. Contemporary Philosophy (3-0; 3-0)

A discussion of the main currents of present-day philosophical thought.
Prerequisite: A previous course in Philosophy or consent of department.

346. Medieval Philosophy (3-0; 3-0)

An introduction to the philosophy of the Middle Ages. Stress will be laid on the reading of texts, especially those of St. Augustine, St. Bonaventure, St. Thomas Aquinas, Duns Scotus and William of Ockham. Arabian and Jewish philosophy will also be considered as essential to the picture of philosophical thought.

Prerequisite: Philosophy 240 or 242 or 246.

348. Nineteenth Century Philosophy (3-0; 3-0)
Prerequisite: Philosophy 240.

350. Aesthetics (3-0; 3-0)
An inquiry into the nature and justification of standards of art and beauty.

352. Social Philosophy (3-0; 3-0)
A philosophical and synoptic study of the nature of society.

354. Ethics (3-0; 3-0)
An inquiry into the nature and justification of moral standards.

358. Philosophy of Religion (3-0; 3-0)
A philosophical examination of the fundamental concepts of religious thinking.
Prerequisite: A previous course in philosophy, or consent of department.

360. Symbolic Logic (3-0; 3-0)
An introduction to the logic of both natural and artificial languages emphasizing logical features such as inference, deduction, substitution and satisfiability. A symbolic deductive system governed only by explicit rules will be constructed and the properties of such a system will be examined.

362. Empirical Semantics (3-0; 3-0)
This course undertakes empirical investigations into the meaning and use of key-words, locutions, and sentences, the clarification of which may be considered of philosophical and scientific importance.
Prerequisite: Philosophy 260 or consent of instructor.

462. Philosophy of Science 3-0; 3-0)
An enquiry into the methods and techniques of science.
Prerequisite: Philosophy 260 or consent of department.

464. Existentialism (3-0; 3-0)
This course examines the Existentialist approach, concentrates on more technical contributions to epistomology, ontology and ethics made by such repreresentatives as Kierkegaard, Heidegger, Jaspers and Sartre, and compares their approaches with German Idealism, German and French Phenomenology as well as with varieties of modern analytically oriented philosophy.
Prerequisite: Philosophy 240 or consent of department.

Honors and Graduate Courses—

Candidates for honors will arrange their program in consultation with the head of the department.

502. Plato (3-0; 3-0)

504. Aristotle (3-0; 3-0)

506. St. Thomas Aquinas (3-0; 3-0)

510. Hegel (3-0; 3-0)

512. Marx and Marxism (3-0; 3-0)

514. Kierkegaard (3-0; 3-0)

516. Wittgenstein (3-0; 3-0)

524. Political and Social Philosophy (3-0; 3-0)

526. Philosophy of Art (3-0; 3-0)

528. Philosophy of History (3-0; 3-0)

536. Contemporary Phenomenology (3-0; 3-0)

548. Conference Course

554. Theory of Value

556. The Philosophy of Kant

558. The Philosophy of Religion

560. Logic (Advanced Course)

566. Theory of Knowledge

568. Philosophy of Mind

570. Philosophy of Language

574. Seminar in Philosophy and Psychology (2s-0; 2s-0)
A study of the fundamental methodological, conceptual, and philosophical issues in psychology.

PHYSICAL EDUCATION

Instruction offered by members of the Faculty of Physical Education.

Phys. Ed. 218. Recreational Activities—C. J. Drake and Staff (0-2; 0-2)
Emphasis on the fundamentals of the following recreational activities: touch football, Bordenball, volleyball, badminton, basketball, tumbling, aquatics, circuit training and golf.
Course required of all first-year men.

Phys. Ed. 228. Recreational Activities—R. Anderson and Staff (0-2; 0-2)
Emphasis on the fundamentals of the following recreational activities: tennis, aquatics, badminton, volleyball, basketball, social dancing and golf.
Course required of all first-year women.

POLISH

See Slavonic Languages and Literature

POLITICAL SCIENCE

Professors—G. R. Davy (Head), K. Gordon
Associate Professors—B. R. Bociurkiw, W. F. Dawson
Assistant Professors—R. Baird, R. R. Gilsdorf, N. O. Linton, T. C. Pocklington, S. Qureshi

Honors in Political Science

First Year

Political Science 200.
English 200.
A laboratory science.
Two options to be chosen in consultation with the department.
Physical Education.

Second Year

Two courses in Political Science.
Three options to be chosen in consultation with the department.

Third and Fourth Years

Before entering the third year, each student will arrange, in consultation with the department, a program of study and lectures to prepare himself for final comprehensive examinations. Unless they have been taken in the First and Second Years, two courses in foreign languages, preferably French or German or Russian, are required. Students may take either two courses in one language or one in each of two languages.

Students wishing to undertake a program of Slavonic and Soviet studies may register for Honors in Political Science. By choosing his options according to the course requirements set out by an interdepartmental committee, a student may qualify to have the notation "Slavonic and Soviet Studies" added to his record upon satisfactory completion of his whole program.

Advice to General Program Students

Students interested in Political Science as a subject of concentration should take one of the following sequences:

Three course sequence: Political Science 200 and two senior Political Science courses;

Four course sequence: Political Science 200 and three senior Political Science courses;

Five course sequence: Political Science 200, Political Science 310 and three other senior Political Science courses.

Students who elect a five course sequence as a preparation for graduate studies in Political Science should consult the Department.

Junior Course—

200. Elements of Political Science (3-0; 3-0)

A study of the principles and practices of modern government, with emphasis on the democratic constitutional state. Among the topics studied are the nature and theory of the state; types of constitutions; the functions and composition of the legislature, executive and judiciary; representation; political parties and pressure groups.

Senior Courses—

310. History of Political Thought (3-0; 3-0)

A historical and critical survey of the development of political and social philosophy from Ancient Greece to the present time, with selected readings from major political writers.

320. Government of Canada (3-0; 3-0)

A study of the structure and functioning of the government of Canada, especially of the Commons, the Senate, the Cabinet System, the Civil Service; and the role of political parties.

331. Government of the United States (3-0; 3-0)

A study of the history and background of American political institutions. Emphasis will be placed on the development, significance and philosophy of the Constitution, and on parties, pressure groups and the working of congressional government.

340. Soviet Government and Politics (3-0; 3-0)

An analysis of theory and practice of the Soviet state, with special attention to Bolshevik political theory, the Communist party, political institutions, federalism and the policy-making processes in the U.S.S.R.

360. International Politics (3-0; 3-0)

A study from the viewpoint of political science of the elements and general nature of the relations between modern states. The framework and functioning of international institutions—law, diplomacy and organization—is studied and attention is paid to the political and other forces at work, including the role of power and the efforts to achieve international peace.

370. Politics of Emergent Nations (3-0; 3-0)

A study of the institutions and politics of selected nations in Asia, Africa and Latin America.

371. Governments of the United Kingdom and Commonwealth (3-0; 3-0)

A study of the structure and functioning of the government of the United Kingdom, and the adaptation of the Cabinet System in selected countries within the Commonwealth.

381. Governments of Continental Europe (3-0; 3-0)

A study of the structure and functioning of selected governments of Continental Europe.

391. Parties and Pressure Groups (3-0; 3-0)

A study of the role of political parties and pressure groups in the governmental process.

393. Political Sociology (3-0; 3-0)

A study of the social basis of political institutions and practices, and of the impact of these institutions and practices on society.

Prequisite: Political Science 200 or Sociology 202.

451. Theory of Public Administration

A study of the place and significance of administration in government, administrative organization and management, governmental and public control of administration, with special references to Canada, the United Kingdom and the United States.

Prerequisite: Political Science 320 or 331 or 371.

461. International Organization (3-0; 3-0)

A study of the historical development, structure and functions of international organizations, with special emphasis on the League of Nations, United Nations and Specialized Agencies.

463. Developments in World Politics Since 1945 (3-0; 3-0)
A survey of the major developments in world politics since 1945, with special emphasis on the foreign policies of the major powers.
Prerequisite: Political Science 200 or consent of the department.

Honors and Graduate Courses—

501. Comparative Political Institutions (3s-0; 3s-0)
A comparative study of the political institutions of democratic and non-democratic states.

510. Advanced Political Thought (3s-0; 3s-0)
A detailed analysis of certain major political theories.
Prerequisite: Political Science 310, or the consent of the department.

541. Seminar in Soviet Politics (3s-0; 3s-0)
An advanced study of several areas of Soviet domestic politics.
Prerequisite: Political Science 340, or the consent of the department.

543. Seminar in Slavonic and Soviet Studies (3s-0; 3s-0)
An Interdepartment Seminar.

593. Political Behaviour (3s-0; 3s-0)
A study of government and politics from a sociological and psychological point of view including the study of parties and pressure groups, public opinion, voting in elections and voting in legislatures.

600. Political Institutions (3s-0; 3s-0)

605. Systematic Study of Politics (3s-0; 3s-0)

610. Political Theory (3s-0; 3s-0)

613. Seminar in Soviet Political Theory (3s-0; 3s-0)

621. Government of Canada (3s-0; 3s-0)

641. Research in Soviet Government (3s-0; 3s-0)

651. Public Administration (3s-0; 3s-0)

660. Theories of International Politics (3s-0; 3s-0)

661. International Politics (3s-0; 3s-0)

663. Problems of International Organization: Political and Security (3s-0; 3s-0)

665. Problems of International Organization: Economic and Social (3s-0; 3s-0)

673. Government and Politics in South and East Asia (3-0; 3-0)
A study of the nationalist movements, constitutional developments, political parties and processes in South and East Asia, with particular reference to Pakistan, India, Indonesia and Japan. Special emphasis will be given post-war policies and governmental institutions.
Prerequisite: Political Science 370.

690. Political Behaviour (3s-0; 3s-0)

PSYCHOLOGY*

Professors—J. R. Royce (Head), D. E. Smith, L. von Bertalanffy

Associate Professors—A. J. B. Hough, E. Howarth, M. Humphries, T. M. Nelson, P. P. Rempel, W. N. Runquist, W. A. S. Smith (Executive Secretary), D. Spearman, Lolita Wilson

Assistant Professors—W. Blanchard, B. Rule (Part-time), S. J. Rule, R. M. Suinn, T. Weckowicz

Research Assoicate—A. B. Carran

Honors Programs

The Department offers both the B.A. and the B.Sc. degrees with honors in Psychology. Students wishing to emphasize the Humanities and Social Sciences in their program should register for the B.A.; those who wish to emphasize the Physical and Biological Sciences should register for the B.Sc.

Honors in Psychology will require six to ten courses in Psychology including the following: Psychology 202, 309; one Science course with lab; one Arts course; and the Honors Seminar 501. The Honors Seminar must be taken each year that the student is in residence in the Honors program at the University, with the exception of the Freshman Year. A minimum of five courses will be taken in related subjects, one of which must be Statistics 305. The courses in related subjects might be all in one field (e.g. Mathematics or Biology) or in several, depending on the student's special interest and relevance of the courses to the subject matter of Psychology.

In addition a minimum of five optional courses will be chosen; some of these will be integrated with the program in Psychology while others must be general options.

An important feaure of the Honors program is the opportunity for the student to engage in independent study and research. During the fourth year the student will write an Honors thesis under the guidance of a member of the Department.

In addition to the regular course examination, candidates for Honors will present their theses at a departmental seminar. Such seminars will comprise a major component of the Honors Seminars required of all students in the program.

Advice to General Program Students

The Department of Psychology offers courses leading to both the B.A. and B.Sc. degrees. Students wishing to emphasize the Biological Sciences in their programs should register for the B.Sc. and follow one of the sequences suggested in the Faculty of Science Calendar. Students wishing to emphasize the Humanities and Social Sciences should register for the B.A. and follow one of the following sequences:

Three course sequence: Psychology 202; Psychology 309; one half-course (with laboratory) listed in the Calendar of the Faculty of Science; one senior Psychology course listed in the Calendar of the Faculty of Arts.

Four or five course sequence: As above, plus either one or two senior Psychology courses which may be chosen from the Calendar of either faculty.

---

*See also Faculty of Science section of the Calendar

Junior Courses—

202. Introduction to General Psychology (3-0; 3-0)

A survey of problems, methods and principles in various fields of psychology.

212. General and Developmental Psychology (3-0; 3-0)

A survey of problems, methods and principles in several fields of psychology, with particular emphasis on child, adolescent and adult development and behaviour.

(This course is designed primarily for students in professional schools, such as Nursing and Physical Education, and is not open to students with credit in another introductory course in Psychology.)

Senior Courses—

320. Psychology Applied to Business and Industry (3-0; 3-0)

Methods and results of psychological studies in such fields as:
(a) selection, placement, training and supervision of personnel;
(b) promotion of efficiency and safety in production;
(c) advertising, selling and consumer research.

337. Individual Differences (3-0; 0-0) or (0-0; 3-0)

A survey of the biological and social conditions contributing to variations among individuals; methods for describing individuality.

341. Social Psychology (3-0; 0-0) or (0-0; 3-0)

An introduction to the study of individual and group behaviour observed in social processes.
Prerequisite: Psychology 202 or Sociology 202.
NOTE: Psychology 341 and Sociology 341 may not both be taken for credit.

353. Developmental Psychology (3-0; 0-0) or (0-0; 3-0)

A study of behaviour as it is related to normal development and aging.

383. Personality (3-0; 0-0) or (0-0; 3-0)

An introductory survey of the area of personality including a study of representative theoretical points of view and research relevant to the major problems in this area.
Prerequisite: Psychology 202.

431. Theory and Practice of Psychometrics (3-3; 0-0) or (0-0; 3-3)

The nature of psychological tests, with practical work in administration, scoring and interpretation of tests.
Prerequisite: Psychology 202 and Statictics 205, or consent of the department.

441. Experimental Social Psychology (3-2; 0-0) or (0-0; 3-2)

Basic research design, techniques and procedure in experimental studies in social psychology. Independent investigation in such areas as group dynamics and psycholinguistics.
Prerequisite: Psychology 202 or Sociology 202; Psychology 309 and one half-course in Experimental Psychology, or consent of the department.

489. Abnormal Psychology (3-0; 0-0) or (0-0; 3-0)

A general introduction to abnormal psychology.
Prerequisite: Psychology 202 and consent of the department.

490. Psychology of Alienation (0-0; 3-0)

An examination of the psychological aspects of such conditions as loneliness, meaninglessness, existential anguish, and isolation.

Prerequisite: Psychology 341 or Sociology 341 or Psychology 489.

492. Creativity (3-0; 0-0)

An examination of the views and research concerning the creative process, including an attempt at understanding the manifestations of the creative process in different fields.

Prerequisite: Consent of the department.

NOTE: Open to senior students in any department. Some effort will be made to select students with diverse academic training.

501. Honors Seminar (3-0; 3-0)

A discussion of current topics in Psychology. Required of all students enrolled in Honors during their second, third and fourth years.

502. History and Systems (3-0; 3-0)

An historical survey of problems and theories in Psychology, including modern systems of Psychology.

504. Conference Course (3-0; 0-0)

505. Conference Course (0-0; 3-0)

520. Seminar in Industrial Psychology (3-0; 3-0)

Prerequisite: Psychology 320.

536. Clinical Psychometrics (3-3; 3-3)

Diagnostic clinical tests: Wechsler-Bellevue, Binet, Minnesota Multiphasic, Rorschach, Thematic Apperception Tests, Szondi, etc., with practical work in administration, scoring and interpretation.

Prerequisite: Psychology 431 and Psychology 489.

538. Advanced Clinical Psychometrics (3-3; 3-3)

Prerequisite: Psychology 536, and consent of department.

540. Seminar in Social Psychology (3-0; 3-0)

547. Psychology of Religion (3-0; 0-0)or(0-0; 3-0)

550. Experimental Analysis of Personality (3-0; 0-0)or(0-0; 3-0)

Latest techniques for measurement and experimental study of such personality factors as neuroticism, anxiety, hysteria, extroversion, conflict, and motivation structure.

Prerequisite; Psychology 202.

574. Seminar in Philosophy and Psychology (2s-0; 2s-0)

A study of the fundamental methodological, conceptual and philosophical issues in psychology.

Prerequisite: Advanced standing in philosophy or psychology.

NOTE: Psychology 574 and Philosophy 574 may *not* both be taken for credit.

583. Personality and Social Psychology (3-0; 3-0)

A survey at an advanced level of the general areas of Differential and Social Psychology. In the first half of the course emphasis will be placed on representative theoretical points of view and research relevant to the major problems in the area of personality. In the second half of the course emphasis will be on social influences on behavior.

584. Seminar in Personality Theory (3s-0; 3s-0)

Prerequisite: Psychology 383.

588. Advanced Abnormal Psychology (3-0; 3-0)

The psychodynamics of abnormal behavior as a basis for understanding mental development and adjustment, the psychoneuroses, the functional psychoses, and treatment.

Prerequisite: Psychology 489.

590. Clinical Psychology and Therapy (3-3; 3-3)

The theoretical aspect of therapeutic methods in relation to the psychologist's role in diagnosis and therapy, with practical instruction in interviewing, counselling and other techniques.

Prerequisite: Psychology 489 and Psychology 536.

599. Honors Thesis (3-3; 3-3)

Students in their fourth year of honors will pursue a research project under the direction of a member of the department.

600. Research Seminar (2s-0; 2s-0)

Reports by students and staff on current research in the department. Required each year of all graduate students in the Department of Psychology and for fourth year honors students.

648. Research (3-3; 0-0)

649. Research (0-0; 3-3)

698. Advanced Research (3-3; 0-0)

699. Advanced Research (0-0; 3-3)

ROMANCE LANGUAGES

Professor—E. J. H. Greene (Head)

Associate Professors—M. Faucher, J. Ferraté, C. H. Moore, R. G. Motut (Administrator of the Laboratory) H. S. Robertson, G. Samuel

Assistant Professors—Carla Colter, B. Billion du Plan, E. Marxheimer, E. Musacchio

Lecturers—A. J. Ballah, Anita J. Holden, M. Kalinowski

Honors in Romance Languages

The Honors program is designed to provide two years of general culture and two years of concentration in the major field selected. A student may therefore enter Honors at the end of the first or second year of the general B.A., provided he has the required standing and provided he has made a suitable course selection. The

Honors program consists of seven or eight courses in French or Spanish, three or four in a second Romance language, and eight to ten approved options (one of which must be a Science course in the first year), for a total of twenty courses. In addition, Honors students will take, each year, such laboratory hours as may be deemed necessary to improve their oral proficiency.

Combined Honors

A degree with Honors in French and an approved second subject such as Latin, English, German or Russian, will be awarded to students successfully completing a program of studies similar to the one outlined above, except that the number of senior courses will be as nearly as possible equal in each of the two languages. All such programs must be approved by both the departments concerned.

FRENCH

Advice to General Program Students

The following sequences are recommended to students choosing French as a subject of concentration:

1. For students beginning the language at the University: French 100 in the first year; French 200 in the second; up to three of French 330, 350, 360, 370, 375, 380, in the third year.
2. For students entering the University with matriculation French: French 200 in the first year; one or two of French 330, 350, 360, 370, 375, 380, in the second year; one or two of 350, 360, 375, 380, 399, 400, in the third year.

Neither French 330 nor 350 may be taken *after* any of the other senior courses.

French-speaking students and students beginning the B.A. with more than matriculation French should arrange with the Department, before registering, to take a placement test, in order that they may start their sequence with the appropriate course.

Junior Courses—

100. Beginners' French (5-0; 5-0)

French 100 is designed to enable students entering with complete matriculation but without French to begin their study of this language in the University.

NOTE: Normally, students will go from French 100 to French 200.

200. First Year University French (3-1; 3-1)

This is an intensive course in reading modern French, French grammar and composition.

Prerequisite: Grade XII French or French 100.

Senior Courses—

Grammar, composition and oral work will be done in all senior courses.

330. French Language and Civilization (3-0; 3-0)

Pronunciation: sounds of the French language; the International Phonetic Alphabet; drill in basic speech patterns.

Grammar: a general review with emphasis on those constructions in which French usage differs from English; translation from French to English and from English to French.

Civilization: aspects of contemporary French life and letters; specimens of post-war prose and verse.
Prerequisite: French 200.
NOTE: This course, designed for teachers and prospective teachers, will *not* overlap, or serve as a substitute for, Education CI 263.

350. Second Year French Authors and Grammar (3-0; 3-0)
The study of representative literary works from the Middle Ages to the present day; oral and composition work based on the texts studied. The principal authors are Villon, Ronsard, Molière, Voltaire, Baudelaire, Maupassant and Camus. An intermediate course.
Prerequisite: French 200.

360. Eighteenth Century (3-0; 3-0)
A study of the literature and the evolution of ideas in the eighteenth century: Fontenelle, Marivaux, Montesquieu, Voltaire, Diderot, Rousseau, Beaumarchais.
Prerequisite: French 200.

370. Romantic Period (3-0; 3-0)
A study of the sources and history of French romanticism: Mme de Staël, Chateaubriand, Lamartine, Hugo, Musset, Vigny.
Prerequisite: French 200.

375. Realism (3-0; 3-0)
This course deals with the definition and history of realism, the development of the novel: Stendhal, Mérimée, Balzac and Flaubert, and the poetry of Baudelaire.
Prerequisite: French 200.

380. Prose and Poetry of the Late Nineteenth Century (3-0; 3-0)
A study of naturalism in the novel and of the Parnassian and Symbolist schools of poetry.
Prerequisite: French 200.

399. Introduction to French Medieval Language and Literature (3-0; 3-0)
An introduction to the literature of medieval France and the development of Vulgar Latin to Modern French.
Prerequisite: One senior French course.

400. Seventeenth Century (3-0; 3-0)
This course consists of a study of the literature and society of the seventeenth century in France. The classical theatre: Corneille, Molière, Racine; the novel; Descartes; Pascal; La Rochefoucauld and La Bruyère; La Fontaine.
Prerequisite: One senior French course.

450. Contemporary French Authors (3-0; 3-0)
Prerequisite: Consent of the department.

Honors and Graduate Courses—

502. Practical Study of the French Language (0-1; 0-1)
Second year Honors laboratory hour.

503. Practical Study of the French Language (1-0; 1-0)
Third year Honors laboratory hour.

510. Seminar in French Composition (3-0; 3-0)
For fourth year Honors and Graduate students. An intensive training in the preparation and oral presentation of reports in French.

600. French Medieval Literature (3-0; 0-0)
This course alternates with French 601.

601. History of the French Language (3-0; 3-0)
This course alternates with French 600.

610. The Renaissance (3-0; 3-0)

612. The Spirit of Humanism in France and England at the Beginning of the Renaissance (3-0; 3-0)

614. Rabelais (3-0; 3-0)

616. Ronsard (3-0; 3-0)

618. Montaigne (3-0; 3-0)

620. The French Moralists (3-0; 3-0)

625. Molière (3-0; 3-0)

630. The Eighteenth Century Novel (3-0; 3-0)

634. Marivaux (3-0; 3-0)

636. Voltaire (3-0; 3-0)

638. Rousseau (3-0; 3-0)

645. Stendhal (3-0; 3-0)

648. Literature and the Plastic Arts from the Time of Delacroix and Baudelaire (3-0; 3-0)

650. Maupassant (3-0; 3-0)

651. The Naturalistic Novel (3-0; 3-0)

655. The Late Nineteenth Century Theatre (3-0; 3-0)

665. Valéry (3-0; 3-0)

670. Proust (3-0; 3-0)

699. Conference Course
An honors or graduate course designed to meet the needs of individual students. It will consist of a detailed study of some great author or literary question not dealt with in the other honors or graduate courses.

SPANISH

Advice to General Program Students

The following sequences of courses are recommended to students choosing Spanish as a subject of concentration:

1. Spanish 100, 300, and 360 or 370, in a three course sequence;
2. Spanish 100, 300 and 320, and one of 360 or 370, in a four course sequence,
3. Spanish 100, 300 and 320, 360 and 370, in a five course sequence.

Junior Courses—

100. Beginners' Spanish (5-0; 5-0)

A first course in Spanish grammar and pronunciation; an introduction to Spanish and Hispano-American civilization.

Senior Courses—

300. Second Year Spanish Authors and Grammar (3-0; 3-0)

Spanish and Hispano-American authors from the late nineteenth century to our times. An intensive study of syntax and phonetics.
Prerequisite: Spanish 100 or the equivalent.

320. Contemporary Prose and Composition (3-0; 3-0)

Readings and literary study of selected Spanish and Hispano-American texts; written reports on these works.
Corequisite: Spanish 300 or 360 or 370.

360. Spanish Prose Fiction of the Golden Age (3-0; 3-0)

La Celestina and the dialogue novel up to Lope's *Dorotea;* the novela picaresca and other contemporary narrative genres (libros de caballerías, novela morisca, novela pastoril, etc.); Cervantes' *Don Quijote* and *Novelas ejemplares.*
Prerequisite: Spanish 300.

370. Spanish Poetry and Drama from the late XVth Century to 1700 (3-0; 3-0)

Their main forms and development through the Golden Age studied in a wide choice of texts.
Prerequisite: Spanish 300.

Honors and Graduate Courses—

502. Practical Study of the Spanish Language (0-1; 0-1)

Second year honors laboratory hour.

503. Practical Study of the Spanish Language (0-1; 0-1)

Third year honors laboratory hour.

504. Practical Study of the Spanish Language (0-1; 0-1)

Fourth year honors laboratory hour.

540. History of the Spanish Language (3-0; 3-0)

550. Medieval Narrative Poetry (3-0; 3-0)

A critical reading of the main extant texts: *Cantar de Mio Cid,* Gonzalo de Berceo, *Libro de Alexandre, Poema de Fernán Gonzáles,* etc.

570. Galdós and his Contemporaries (3-0; 3-0)

580. Contemporary Spanish and Hispano-American Poetry (3-0; 3-0)

590. Modern Spanish and Hispano-American Novelists (3-0; 3-0)

605. Medieval Spanish Prose (3-0; 3-0)

625. Spanish Baroque Poetry (3-0; 3-0)

699. Conference Course

An honors or graduate course designed to meet the needs of individual students. It will consist of a detailed study of some great author or literary question not dealt with in other honors or graduate courses.

ITALIAN

A three course sequence is available to students beginning Italian at the University.

100. Beginners' Italian (5-0; 5-0)

An introductory course in Italian grammar and pronunciation. Readings of easy texts dealing with different aspects of Italian culture to provide a background for further studies.

300. Second Year Italian (3-0; 3-0)

A study of selected contemporary prose and poetry. Advanced grammar and phonetics.
Prerequisite: Italian 100 or equivalent.

350. Italian Literature in English Translation (3-0; 3-0)

The origins of the sonnet and the *canzone,* Dante's *Divine Comedy,* the works of Petrarch, the lyric madrigal, the early novelists from Boccaccio to Masuccio, new concepts of drama: *commedia dell' arte, commedia erudita* and early opera texts, Platonist writers and the Arts: Ficino, Leonardo da Vinci, Michelangelo, the Renaissance epic of Ariosto and Tasso, Marinismo and the Baroque.

360. The Italian Theatre (3-0; 3-0)

Selected plays by Machiavelli, Goldoni, Alfieri and Pirandello.
Prerequisite: Italian 300.

370. Nineteenth Century Italian Literature (3-0; 3-0)

A study centered upon the three major writers of the century: Foscolo, Manzoni, Leopardi.

502. Practical Study of the Italian Language (0-1; 0-1)

Second year honors laboratory course.

699. Conference Course

An honors or graduate course designed to meet the needs of individual students. It will consist of a detailed study of some great author or question not dealt with in the other honors or graduate courses.

RUSSIAN

(See Slavonic Languages and Literature)

SCANDINAVIAN

(See Germanic Languages and General Linguistics)

SLAVONIC LANGUAGES AND LITERATURE

Associate Professor—O. Starchuk
Assistant Professors—W. Carey, J. Laychuk, G. Melnikov, Y. Slavutych
Lecturer—G. Schaarschmidt

Honors in Slavonic Languages

The Honors Program of the Department of Slavonic Languages is designed primarily to provide a sound knowledge of Russian language and literature in preparation for advanced study toward higher degrees and a professional or academic career.

The Department also offers:

(1) a special program of studies of Central and Eastern Europe and Soviet Asia (see (b) below) in conjunction with the Departments of History and Political Economy;

(2) a combined Honors program involving, for example, study of Russian and English, Russian and French, Russian and Latin, etc.

Degrees with Honors from this Department fall into these groups:

(a) B.A. with Honors in Russian with an approved second subject such as English, French, German, History, Latin, a second Slavonic language, etc.;

(b) B.A. with Honors in Slavonic and Soviet Studies, with Russian language and literature serving as the core;

(c) B.A. in the combined Honors program.

Programs in group (a) will require a maximum of eight courses in the major, four to six in the second subject, and six to eight approved options (one of which must be a Science course in the first year), for a total of twenty courses. Programs in this group will be arranged in consultation with the departments concerned.

Programs in group (b) will require seven courses in Russian, two or three courses in a second Slavonic language, Introduction to Comparative Slavonic Philology 540, the Seminar in Slavonic Philology 545, one Science course in the first year, four approved options, and four or five courses, approved by an inter-departmental committee, in History, Economics or Political Science related to the Slavic area, for a total of twenty courses and one seminar. Programs in group (c) will require that the number of senior courses in each subject be as nearly as possible equal and selected in accordance with departmental requirements.

All Honors students will take, in each year, such laboratory hours as may be deemed necessary to improve their oral proficiency.

RUSSIAN

Advice to General Program Students

The following sequences of courses are recommended to students choosing Russian as a subject of concentration:

1. Russian 100, 300 and 360, in a three course sequence;
2. Russian 100, 300, 360, and one of 320 or 380, in a four course sequence;
3. Russian 100, 300 and 320, 360, and one of 380 or 400, in a five course sequence.

Junior Courses—

100. Begineers' Russian (Arts Section) (5-0; 5-0)

This course is elementary and is designed to give a working knowledge of the Russian language. It provides a study of the essentials of grammar, reading, and drill on useful expressions.

210. Beginners' Russian (Science Section) (3-0; 3-0)

This course is designed to meet the needs of honors students in the science departments, students of the Faculties of Engineering, Agriculture, Dentistry, Medicine and Graduate Studies of any year who require a reading knowledge of Russian scientific literature.

NOTE: Not open to general program students.

Senior Courses—

300. Second Year Russian (Arts Section) (3-0; 3-0)

Advanced Russian grammar, composition, and oral practice based on selected texts of Russian classical and contemporary literature.

Prerequisite: Russian 100.

310. Second Year Russian (Science Section) (3-0; 3-0)

This course is a continuation of Russian 210. Russian scientific articles of current interest will be provided, discussed and translated. The course will give students a sufficient command of the language to enable them to translate advanced Russian texts in their fields of study.

320. Selected Prose, Poetry and Drama of the Nineteenth Century (3-0; 3-0)

Reading and literary study of one major classical novel, one play by Chekhov, and selected poems. Composition based on these works.

Corequisite: Russian 300.

350. Russian Literature in English (3-0; 3-0)

A study of major Russian authors of the 19th and 20th centuries with special emphasis on their works in the large context of Russian cultural evolution. This evolution will be illustrated from the Department's collection of slides on Russian art, architecture and natural environment.

This course is an Arts option for second and third year students in Arts or Science. It is not open to honors students in Russian.

360. Survey of the History of the Eastern Slavonic and Russian Literatures (3-0; 3-0)

Oral literature, the first writings, literature from the epic *Tale of Igor's Expedition* of the Twelfth Century up to and including Classicism, Romanticism, Realism and the influence of the Naturalistic School. Social and political background.

Advanced Russian grammar, conversation and composition.

Reading of the texts of the Nineteenth Century, with composition based on short stories by Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Chekhov and L. N. Tolstoy.

Prerequisite: One senior Russian course.

380. Russian Drama (3-0; 3-0)

History of the Russian Drama and a critical reading of five classics: Krylov's *The Lesson to the Daughters* (Urok dochkam), Griboyedov's *Woe from Wit* (Gore ot uma), A. N. Ostrovsky's *The Thunderstorm* (Groza), Gogol's *The Inspector General* (Revisor) and Chekhov's *The Cherry Orchard* (Vishnëvyi sad).

Prerequisite: One senior Russian course.

400. Russian Literature of the Late Nineteenth and Early Twentieth Centuries (3-0; 3-0)

This course will cover the new literary movements of the period (the religious philosophers, mystical revolutionism, the aesthetic revival and the symbolists, socialist messianism) up to and including the principles of Socialist Realism of Soviet literature, with particular attention to the works of L. N. Tolstoy, Merezhkovsky, Ivanov, Blok, Bely, Balmont, Sologub, Remizov, Gumilëv, Mayakovsky, Akhmatova, Pasternak and others.

Prerequisites: Two senior courses in Russian.

Honors and Graduate Courses—

502. Practical Study of the Russian Language (0-1; 0-1)

Second year Honors laboratory hour.

503. Practical Study of the Russian Language (0-1; 0-1)

Third year Honors laboratory hour.

504. Practical Study of the Russian Language (0-1; 0-1)

Fourth year Honors laboratory hour.

510. Advanced Russian Composition (3-0; 3-0)

This course is designed to enable students to acquire a good command of the written language. It will include the study of difficult grammatical points with a special emphasis on Russian syntax. Compositions will be based upon classical and modern literary works, read and discussed in class.

550. The Russian Psychological Novel (3-0; 3-0)

560. History of the Russian Language (3-0; 3-0)

570. Soviet Russian Literature (3-0; 3-0)

580. Slavonic and Soviet Studies: an interdepartmental seminar (3s-0; 3s-0)

640. Russian Poetry of the 18th and 19th Centuries (3-0; 3-0)

699. Conference Course

This is an honors or graduate course to meet the needs of individual students. It will consist of a detailed study of some great author or literary problem, directed reading and discussion. Courses offered: Pushkin, Lermontov, Gogol, Turgenev, Nekrasov, Dostoevsky, L. N. Tolstoy, Chekhov, Gorky. With the permission of the Department, any other suitable subject may be studied in this course.

POLISH

Polish may be begun at the University. Polish 100 has the status of a first-year course and is credited towards a degree.

100. Beginners' Polish (5-0; 5-0)
This course is elementary and is designed to give a working knowledge of the Polish language. It provides a study of the essentials of grammar, reading and drill on useful expressions.

300. Second Year Polish (3-0; 3-0)
Advanced Polish grammar, composition, and oral practice based on selected texts of Polish classical and contemporary literature.
Prerequisite: Polish 100 or consent of the department.

502. Practical Study of the Polish Language (0-1; 0-1)

UKRAINIAN

A three course sequence is available to students beginning Ukrainian at the University.

Junior Course—

100. Beginners' Ukrainian (5-0; 5-0)
This course is elementary and is designed to give a working knowledge of the Ukrainian language. It provides a study of the essentials of grammar, reading and drill on useful expressions.

Senior Course—

300. Second Year Ukrainian (3-0; 3-0)
Advanced Ukrainian grammar, composition, and oral practice based on selected texts of Ukrainian classical and contemporary literature.
Prerequisite: Ukrainian 100 or consent of the department.

360. Survey of the History of Ukrainian Literature since the Eighteenth Century (3-0; 3-0)
Historical survey of Ukrainian literature from Kotliarevsky to the present. Cultural background, literary works and major writers. Reading of selected texts, with composition based on short stories. Advanced elements of Ukrainian language.
Prerequisite: Ukrainian 300.

502. Practical Study of the Ukrainian Language (0-1; 0-1)
Second year honors laboratory hour.

503. Practical Study of the Ukrainian Language (0-1; 0-1)
Third year honors laboratory hour.

SLAVONIC

520. Old Church Slavonic (3-0; 3-0)
This course is designed to acquaint the student with the first literary language of the Slavs. Readings in Old Church Slavonic will be included in the course.

540. Introduction to Comparative Slavonic Philology (3-0; 3-0)

545. Seminar in Slavonic Philology (1-0; 1-0)

600. Early Eastern Slavonic Literature (3-0; 3-0)

680. Slavonic Civilization (3-0; 3-0)

SOCIOLOGY AND ANTHROPOLOGY

Professor—G. K. Hirabayashi (Head)
Associate Professors—C. S. Brant, C. W. Hobart, W. E. Kalbach, G. Nettler, S. Taylor
Assistant Professors—J. T. Borhek, A. L. Bryan, C. A. S. Hynam, A. P. Jacoby, D. E. R. Larsen, R. Laskin, H. W. Lungstrass, P. W. Marden, H. A. Parker
Sessional Lecturer—R. Gruhn

SOCIOLOGY

Honors in Sociology

Degrees with Honors in Sociology will fall into two groups:
(1) B. A. with Honors in Sociology and an approved minor subject;
(2) B. A. with Honors in Sociology and Psychology.

There are several possible programs within each of these groups, and more detailed information is available from the Department. Students are advised to consult the Department for information before choosing one of the groups, and in any case, Departmental approval of the final program of studies is required before registration. In the case of students under (2), the program will be arranged in consultation with the Department of Psychology.

Honors in Sociology will require eight to ten courses in Sociology. Depending on the special interests of the students, five or six courses in a related minor subject will be taken. An additional five or six courses outside the field of Sociology and the minor area will be required to complete the program.

Honors in Sociology and Psychology will require seven courses in Sociology and seven in Psychology. In addition, six other courses will be required to complete the program.

Students in the honors programs are required to take a foreign language or a year course in statistics during the early part of the program.

In addition to final examinations in courses prescribed, students in the final year of each group will be required to write two comprehensive examinations, one of which may take the form of an essay paper.

Advice to General Program Students

Students interested in Sociology as a subject of concentration should take one of the following sequences:

Three course sequence: Sociology 202 and two senior Sociology courses;
Four course sequence: Sociology 202 and three senior Sociology courses (including one 400 level course);
Five course sequence: Sociology 202 and four senior Sociology courses (including one 400 level course).

Students interested in proceeding to graduate work in Sociology should consult the Department early in their University career.

Junior Course—

202. Introductory Sociology (3-0; 3-0)

An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior.

Senior Courses—

309. Social Statistics (0-0; 3-3)

The application of statistical concepts to the evaluation and interpretation of empirical data in the social sciences.
Prerequisite: Statistics 305

310. Social Science Research Methods (3-2; 3-2)

Study and application of the various research techniques used in sociology and related social sciences, with special emphasis on interviewing, questionnaires, attitude scales, sociometric testing, survey and sampling.
Prerequisite: Sociology 202 or 402 or consent of department.

320. Social Problems (3-0; 3-0)

An analysis of deviant behavior (e.g. crime, juvenile delinquency, drug addiction) and an analysis of social disorganization including world population crisis, urban and rural problems, industrial and other problems.

325. Criminology (3-1; 0-0)

A critical examination of the meaning and attempted explanation of crime and juvenile delinquency, with an analysis of the social processes leading to criminal behavior.

327. Penology and Corrections (0-0; 3-1)

The evolution and evaluation of the theories of punishment, the law and the courts, penal and reformatory institutions, probation and parole, a consideration of the various experiments in reform and rehabilitation.
Prerequisite: Sociology 325.

328. Criminal Careers (0-0; 3-1)

Analysis of types of criminal behavior through the use of individual and limited case methods; social processes involved in the genesis and styles of crime as they apply to the involvement of the particular criminal and victim.
Prerequisite: Sociology 325

329. Juvenile Delinquency (0-0; 3-1)

Analysis of juvenile delinquency and its relation to adult crime; the social processes involved in the genesis and perceptions of styles of delinquency and their relationship to the community, and to various current theories of prevention and control, including the role of institutions and law.
Prerequisite: Sociology 325

341. Social Psychology (3-0; 0-0)

An introduction to the study of individual and group behavior observed in social processes.

Prerequisite: Sociology 202 or 402 or Psychology 202.

NOTE: Sociology 341 and Psychology 341 may *not* both be taken for credit.

343. Collective Behavior (0-0; 3-0)

Analysis of various forms of collective behavior, including crowds, mobs, panics, audiences, fashions, fads, cults, etc.

Prerequisite: Sociology 340 or 341.

344. Mass Communication (0-0; 3-0)

The analysis of socio-psychological effects of mass media of communication, radio, television, movies, comic books, etc.

Prerequisite: Sociology 340 or 341.

345. Social Movements (0-0; 3-0)

The social psychology of involvements in voluntary associations; study of the genesis, development, effect and decline of various social, religious, political movements.

Prerequisite: Sociology 340 or 341 or 376.

346. Public Opinion (0-0; 3-0)

A study of the nature of public opinion, factors involved in the formation of public opinion, and the roles of advertising, propaganda and education techniques in modern society.

Prerequisite: Sociology 340 or 341.

356. Sociology of Rural Life (0-0; 3-0) or (3-0; 0-0)

A study of the rural community and rural social systems, with special reference to changes in the rural way of life.

360. Social Class in Modern Society (3-0; 3-0)

An analysis of social stratification in western society, with reference to the effects of industrialization, and including comparative analysis of primitive societies. Special attention given to the basis of stratification, the structure and function of social class systems, social mobility, and the special classes in modern society, such as the "managerial class", labor, and "power eliite", etc.

361. Sociology of Occupation and Professions (3-0; 3-0)

Occupational recruitment, selection and induction; training and socialization, occupational mobility; job and career patterns; client-professional relationships; occupations and professional association; inter-occupational relations; work in complex organizations; the professionalization of occupations; public attitudes and occupational stereotypes.

Prerequisite: Sociology 202, or 402 or consent of the Instructor.

370. The Family (3-0; 3-0)

Structure and function of the family, comparative family systems, sociology of family life stages (such as childhood, adolescence, adulthood, old age), contemporary trends and problems of the family.

376. Sociology of Religion (3-0; 0-0) or (0-0; 3-0)

Sociological analysis of religious behavior in modern society. Special attention is given to the relationship between religion and social stratification, economic and social change. A general approach to the study of systems of belief will be presented.

380. Minority and Ethnic Group Relations (3-0; 3-0)

A study of the problems arising from racial and minority status. An analysis of the sources of prejudice, current theories of race and culture, and the effect of interracial and minority group contacts. An examination of critical situations requiring adjustment and social treatment.

390. Industrial Sociology (3-1; 3-1)

A sociological analysis of the industrial system; industrial bureaucracy; the industrial roles of executives, specialists, foremen, office and plant workers; formal and informal groups; social structure of trade unionism; management-labour relations; industry in relation to social stratification, minority groups, family, government, technological and social change. Field trips to local industries.

393. Political Sociology (3-0; 3-0)

A study of the social basis of political institutions and practices, and of the impact of these institutions and practices on society.
Prerequisite: Sociology 202 or 402 or Political Science 200.

394. Medical Sociology (3-0; 3-1)

The role of sociology in medicine; analysis of sociological concepts in the field of medicine; review of recent research in areas such as attitudes toward illness and health, hospital organization, medical services, doctor-patient relationships.

395. Sociological Foundations of Social Work (3-1; 3-1)

The development of social work as a social institution; a consideration of various philosophies and practices of social work; social work as a part of community organization; current trends and problems; a study of the structure and function of private and public agencies. Field trips will be used.
Prerequisite: Sociology 202 or 402 or Psychology 202, and consent of department.

402. Principles of Sociology (3-0; 3-0)

A course in basic principles of sociology for students with advanced standing. Not given for credit to those with Sociology 202 credit.
Prerequisite: Senior or graduate standing.

410. Sociological Analysis (3-2; 3-2)

Study of techniques used in sociological analysis; application of analytical techniques to social data, critical evaluation of presently used techniques and examination and development of alternative approaches.
Prerequisite: Sociology 310 or consent of department.

425. Research Problems in Criminology (0-0; 3-2) or (3-2; 0-0)
Examination of theories of criminal behavior and various methods of testing the hypotheses emerging from these theories.
Prerequisite: Sociology 325, and either Sociology 310 or consent of instructor.

426. Criminal Control (0-0; 3-0) or (3-0; 0-0)
Study of proposals advanced to control criminal behavior; the interrelationship of the social sciences with the law, law enforcement and welfare agencies.
Prerequisite: Sociology 325.

430. History of Sociological Thought (3-0; 3-0)
The historical roots of sociology, beginnings of modern sociology, and development of sociological theory to present times.
Prerequisite: Sociology 202 or 402 or consent of department.

431. Social Change (3-0; 3-0)
A study of the significance of change in social and cultural systems; theories of social change, analysis of current trends and discussion of problems of induced change in selected cultures.
Prerequisite: Sociology 202 or 402 or consent of department.

450. The Human Community (3-0; 3-0)
A study of human communities; their institutional structure, ecological factors associated with patterns of growth, community relations, community planning.
Prerequisite: Sociology 202 or 402 or consent of department.

452. Population (3-0; 0-0)
A study of population and its composition, with special reference to trends in Canada. Class, occupational, and rural-urban differences with respect to population changes. The problem of human migration.
Prerequisite: Sociology 202 or 402 or consent of department.

453. Human Ecology (0-0; 3-0)
A study of ecological processes and institutional patterns related to the distribution of human population.
Prerequisite: Sociology 202 or 402 or consent of department.

460. Social Organization (3-0; 3-0)
Theories of social organization, analysis of such forms of social organization as kinship groups, bureaucracy, economic system, science, etc., and their interrelationship in functioning social systems.
Prerequisite: Sociology 202 or 402 or consent of department.

Honors and Graduate Courses—

502. Conference Course in Sociology for Honors and Graduate Students (3-3; 3-3)
Arranged for various topics of sociology on the basis of special interest and need. Consent of department required.

510. Research Seminar (3s-2; 3s-2)

520. Seminar in Social and Personal Disorganization (3s-0; 3s-0)

526. Seminar in Criminological Theory (3s-0; 0-0)

527. Seminar in Correctional Theory (0-0; 3s-0)

530. Seminar in Sociological Theory (3s-0; 3s-0)

536. Seminar in Sociology of Knowledge (3-0; 3-0)

540. Seminar in Social Psychology (3s-0; 3s-0)

542. Small Group Behavior (3-2; 3-2)

550. Seminar in the Human Community (3s-0; 3s-0)

555. Seminar in Demography (3s-0; 0-0)

560. Seminar in Social Organization (3s-0; 0-0)

562. Seminar in Social Class (0-0; 3s-0)

570. Seminar in the Family (0-0; 3s-0)

590. Seminar in Industrial Sociology (3s-0; 0-0)

ANTHROPOLOGY

Honors in Anthropology

B.A. with Honors will require eight to ten courses in Anthropology. Four to five courses will be taken in a related minor subject, depending upon the student's special area of interest in Anthropology. The remainder of the program will be composed of courses outside the field of Anthropology and the minor subject.

Before graduation students will be required to demonstrate a reading knowledge of a modern language other than English.

Departmental approval of the student's program must be secured prior to registration.

In the final year of the Honors program the student will be required to pass a comprehensive examination which may be written, oral or both; it may consist, in part, of a major research paper.

Advice to General Program Students

Students interested in Anthropology as a subject of concentration should take one of the following sequences:

Three course sequence: Anthropology 202 and two senior Anthropology courses;
Four course sequence: Anthropology 202 and three senior Anthropology courses (including one 400 level course);
Five course sequence: Anthropology 202 and four senior Anthropology courses (including one 400 level course).

Junior Course—

202. Introductory Anthropology (3-0; 3-0)
An introduction to the field of anthropology, including human paleontology, race, human prehistory, linguistics and ethnology.

Senior Courses—

302. Cultural Anthropology (3-0; 3-0)
The nature of culture; its uniformities and varieties; comparative study of primitive cultures in terms of family, clan, political organization, economic systems, religion, art, folk lore and social customs; processes of cultural change.

305. Culture and Language (3-0; 3-0)

An inquiry into the nature of human communication, its cultural conditions and consequences. Special attention will be given to the interrelations of the linguistic structures and habitual modes of behaviour and thought of various societies.

350. Indians of North America (3-0; 3-0)

A survey of the cultural and linguistic areas of aboriginal North America, and including a comparative and historical study of technology, social organization, economic systems, religions, art and language. Some emphasis will be given to the Indians of Canada.

360. Peoples and Cultures of Latin America (3-0; 3-0)

Study of the basic sources of modern Latin American society and culture; the aboriginal Indian traditions and those brought from the Iberian Peninsula. Emphasis will be placed on the institutional and value systems of modern Latin America.

370. Peoples and Cultures of Asia (3-0; 3-0)

Study of the major culture groupings in Asia; origins, modern forms and functioning, trends of change. Special attention will be given to the Chinese, Indian and Southeast Asian areas.

Prerequisite: A course in Anthropology or Sociology, or consent of the department.

375. Peoples and Cultures of Africa (3-0; 3-0)

Study of the native cultures with emphasis on the Sub-Saharan part of the continent. Special attention will be given to present day trends of change.

Prerequisite: A course in Anthropology, or consent of the department.

395. Prehistoric Archaeology (3-1; 3-1)

Archaeology as the anthropological approach to reconstruction and study of extinct, non-literate societies; archaeological techniques, methods and modes of interpretation; comparative analysis of the major prehistoric developments of the world.

Prerequisite: A course in Anthropology, or Classics 356, or consent of the department.

402. North American Archaeology (3-1; 3-1)

The peopling of North America and prehistoric development of culture as revealed by archaeological data. Special attention will be given to the archaeology of Canada.

Prerequisite: A course in Anthropology, or consent of the department.

405. Field Methods in Archaeology (3-3; 3-3)

The application of archaeological theory and methods to field problems.

Prerequisite: a previous course in Anthropology or consent of the department.

410. Theory of Culture and Culture Change (3-0; 3-0)

Study of past and current thought concerning the nature of culture and culture change, with attention to such concepts as cultural evolution, dif-

fusion, invention, acculturation, patterns and themes. Relation of theory to problems of planned culture change in underdeveloped areas of the contemporary world.
Prerequisite: Anthropology 202, Sociology 202, or consent of the department.

420. Anthropology of Religion (3-0; 3-0)

A study of supernatural beliefs and practices in primitive and peasant cultures, including magic, shamanism, priesthoods, taboos and folk-beliefs. Special attention will be given to evolutionary, historical and functional theories of religion.
Prerequisite: A course in Anthropology or Sociology, or consent of the department.

470. American Indian Linguistics (3-0; 3-0)

A survey of indigenous languages of North America, with special reference to those spoken in Western Canada. A study of the distribution and structural characteristics of these languages, supplemented by laboratory work involving analysis of an American Indian language, using a native speaker as informant.
Prerequisite: Linguistics 350.

502. Conference Course in Anthropology (3-3; 3-3)

505. Field Methods in Archaeology (3s-3; 3s-3)

SPANISH

See Romance Languages

UKRAINIAN

See Slavonic Languages and Literature

IX

The Faculty of Commerce

INFORMATION, REGULATIONS, COURSES

(1) INTRODUCTION

Purpose of the Commerce Curriculum

The curriculum of the Faculty of Commerce is based on two beliefs:

1. Education for business management is a life long process.
2. Universities can make their greatest contribution to this process by teaching the disciplines and fields of knowledge which underlie the practice of business. Details of current business practice, though important, can best be taught by business itself and learned through experience.

Business and its environment have changed enormously in the last twenty years and will change at an even faster pace in the next twenty. No school of business can possibly teach the solution of problems which will arise twenty years from now. A school should provide the best possible basis for effective life-long learning through actual experience. The school should not ask, "What should the businessman know?" but rather "Of all things he should know, what are best taught in the few years of academic, professional education?" Universities should teach the broad underlying fields of knowledge which are basic to business, and should treat the fields of business practice in comprehensive analytical framework, rather than teach recent or current business practice. Alfred North Whitehead, British philosopher and noted educator, stated this theory in simple words when he said that a properly educated man ". . . will remember by an unconscious common sense how to apply principles to immediate circumstances." In the first two years of the program, the student will take courses in the basic disciplines. Later he will be taught how this basic knowledge may be applied most effectively to the solution of the various problems of business in a general program or in a specialization of his choice which may be selected from the fields of economics, accounting, marketing, production, finance or personnel administration.

The Faculty of Commerce is proud to number among its graduates many individuals now holding positions of trust and leadership in the Canadian business world. A review of the present activities of graduates since the Faculty was organized in 1928 indicates a wide diversity of occupations.

Practical Experience Qualifications

Students must satisfy the Faculty that they have had adequate practical business experience before they will be allowed to graduate. This experience may have been obtained before entering university. If it has not, then arrangements must be made to get it during the summer months. The equivalent of 3 full summers of practical experience (9 months) will be required.

In February of each year an opportunity will be given to students to present themselves before a Committee under the direction of the Dean to outline the work which they have done or intend to do to meet the practical experience qualifications. This should be done before the end of the Second Year.

Advisory Committee to the Faculty of Commerce

To keep staff and students informed about latest trends in business and industry, a group of active leaders in the administration and direction of business enterprises have been invited periodically to meet with the academic staff of the Faculty.

These members are appointed by the Board of Governors upon nomination by the President of the University and the Dean of the Faculty of Commerce.

Mr. Ian Angus, Vice-President and General Manager, Canadian Sugar Factories Ltd., Raymond.

Mr. A. G. Bailey, President, Penwa Oils Ltd.

Mr. A. T. Baker, General Manager, Alberta Wheat Pool, Calgary.

Mr. S. Belzberg, President, Belzberg Enterprises Ltd.

Mr. C. W. Clement, Q.C., Chairman Education Committee, Law Society of Alberta.

Mr. H. K. Collinge, Vice-President and Resident Manager, North Western Pulp and Power, Hinton.

Mr. G. R. Graham, Vice-President, Canadian National Railways.

Mr. O. A. Greiner, Vice-President and Plant Manager, Canadian Chemicals Ltd.

Mr. Donald S. Harvie, General Manager, Canadian Fina Oil Limited, Calgary.

Hon. E. W. Hinman, Provincial Treasurer, Province of Alberta.

Mr. J. Howard Kelly, Q.C., President, Burns and Co. Ltd., Calgary.

Mr. D. L. Lindsay, Manager, Main Branch of Nova Scotia.

Mr. H. H. Millar, President, Western Construction and Lumber Co., Ltd.

Mr. Carl O. Nickle, Editor, Nickle's Daily Oil Bulletin, Calgary.

Mr. T. Sissons, Production Manager, Medicine Hat Brick and Tile Co. Ltd., Medicine Hat.

Mr. M. E. Stewart, General Manager, Northwestern Utilities Ltd.

Mr. B. F. L. Symes, Resident Partner, Peat, Marwick, Mitchell.

Mr. I. Telmer, Manager, Hudson's Bay Co.

Mr. J. M. Tweddle, Finance Commissioner, City of Edmonton.

Mr. M. Wolfe, General Manager, Edmonton Motors Ltd.

Mr. W. S. Ziegler, President, Inland Cement Co.

The Faculty of Commerce makes every effort to give the students opportunities to meet with business leaders and discuss some of the practical problems of business management. In particular, an annual Student Business Day is held during the month of November. At this time leaders in the business community are invited to participate.

Towards the end of the final term before graduation a special banquet is tendered the graduating class and is held under the sponsorship of a leading business association.

Commerce Honours Society

This Society organizes and sponsors meetings of the Commerce Forum. The Commerce Forum invites outstanding people from within the University and

outside the University to discuss matters of general educational interest. Membership in the Commerce Honours Society is restricted to students in the final three years of the program whose personality, ability and academic record are meritorious.

Applications for membership in the Commerce Honours Society must be submitted on the approved forms to the Dean's Secretary by October 10.

Calgary

The University offers in Calgary the first and second years of the course leading to the degree of Bachelor of Commerce.

(2) ADMISSION REQUIREMENTS

Students from Alberta high schools seeking admission to the Faculty of Commerce will be required to present:

(a) a High School Graduation Diploma with

(b) "B" or higher standing in the following Grade XII examination subjects:

1. English 30,
2. Social Studies 30,
3. Mathematics 30,
4. 5 and 6. *Three* of:
   Chemistry 30,
   Physics 30,
   Biology 30 (or 32)
   French 30 or German 30 or Latin 30 or another language at an equivalent level; and

(c) an average in these six courses of at least 60%.

Candidates from outside Alberta will be required to meet equivalent standards and should submit their documents to the Registrar of the University for evaluation. (See III—Admission)

Note: Students who completed Grade XII in 1954 or earlier will be given full consideration for admission. They are advised to write to or see the Registrar of the University and to provide a complete transcript of their high school records.

These general regulations notwithstanding, the University may in its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

(3) PROMOTION AND GRADUATION

Faculty of Commerce

1. Promotion of the student from the first to the second year is contingent on the satisfactory completion in one year of a first year program of normal weight. The regulation applies also to students transferring from other universities.
2. Students must either pass 8 courses with second-class standing, of which not fewer than four must be courses taken in the third and fourth years,

or obtain an average of at least 60% over the last three years of the program.

(4) ACADEMIC HONORS

First Class Standing

First-class standing in a given year is awarded to any student who secures an average mark of not less than 80% in the work of that year.

Degree with Distinction

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of a candidate for the B.Com. degree if the candidate has obtained a weighted average of 80% or higher over the last two years of his program.

(5) PROGRAMS OF STUDY

The curriculum in the Faculty of Commerce is based upon a four year program. During the third and fourth years of the program the student may pursue a general course or may major in Economics, Accounting, Personnel, Finance, Production or Marketing.

Courses in the first two years of the program are offered from time to time in the Summer Session and Evening Credit Program. The final two years of the program may be taken only in the regular Winter Session.

All Programs

First Year

Accounting 200
Business 202
Economics 200
English 210
Approved course in Mathematics or an Arts or Science option
Physical Education

Second Year

Business Law 310
Psychology 202
Computing Science 351
Statistics 305
Business Statistics 306
Philosophy 260 or an approved option, or an Arts or Science option
Business 320

Third Year (See Note below)

Finance 302
Marketing 302
Personnel 302
Production 302
Business 354 or Business 355
An Economics or Commerce option.

The Economics or Commerce option is to be selected from the following courses according to the student's area of interest.

Accounting:	Accounting 300	Marketing:	Marketing 310
Economics:	Economics 300	Personnel:	Economics 330
Finance:	Economics 340	Production:	Production 310
	General:	Any of the above	

NOTE: All third year students must attend a special Banff Seminar which will be scheduled during the latter part of the normal final examination period.

Fourth Year

Business 400

Arts or Science option

Three Economics and Commerce options, of which at least two will be from the specialty.

(6) DETAILS OF COURSES

The university reserves the right to modify or withdraw for the session any of the courses here outlined.

Students are reminded that regular attendance is expected in all courses.

NOTE: The weekly hours of instruction for both terms of the winter session are set out at the top of each course description. The first figure in each term indicates lecture-hours and the second laboratory-hours.

STAFF:—

Professor—Hu Harries (Dean)

Associate Professors—G. R. Feiwel, D. Goodale, C. A. Lee, L. C. Leitch, R. Pinola, W. A. Preshing (Calgary), B. Rollins, A. O. Saffel

Assistant Professors—W. R. Badun, A. G. Blair, W. B. Crowston, H. S. Dulat, G. A. Feltham, H. W. Ford, D. A. Harris, J. G. Johns, R. W. Losie (Calgary), A. C. Perroni, D. N. Thompson, C. B. Williams

Sessional Lecturers—M. A. Denega (Calgary), R. A. Denham, H. Graschuk, P. Herring, L. H. Howard, G. S. Hughes, W. H. Hurlburt, J. Johnson (Calgary), R. H. LeMasurier, J. McGibbon, W. McMullin, M. B. O'Bryne, G. Pearson, J. Tweddle, R. J. Whitehead (Calgary), G. Wright.

ACCOUNTING

Accounting 200. (3-2; 3-2)

Management Accounting—The language of accounting, forms of business organizations, and accounting implications stressing managerial requirements.

Accounting 300. (3-2; 3-2)

Intermediate Accounting—An examination of basic accounting theory, accounting standards, and their application to the preparation of financial statements.

Accounting 411. (3-2; 3-2)

Advanced Accounting Theory—Accounting concepts applied to specific accounting problems, such as consolidation, mergers, refinancing and recapitalization will be considered in detail.

Accounting 421. (3-2; 0-0)

Cost Accounting—Cost concepts relevant to decision making. Techniques used in determining, analyzing and apportionment of costs. Discussion of costs for control purposes.

Accounting 431. (0-0; 3-0)

Auditing and Business Investigation—Auditing standards and applications; investigation of refinancing, purchase, credit, fraud or embezzlement.

Accounting 440. (3-0; 3-0)

Controllership Accounting—Accounting from the standpoint of management for analysis and control.

BIOLOGY

Members of the Departments of Botany and Zoology

Biology 341. (3-2; 3-0)

General Biology—Introduction to the plant and animal kingdoms; organization and development of plants and animals; adaptation to environment; variations, heredity and selection; evolution and origin of species; history of biology; and human welfare.

Note—This course is not open to first year students and may not be taken for credit by students who already have taken Botany 201, or Zoology 220 or Biology 230.

(Not offered, 1964-65).

BUSINESS

Business 202. (3-0; 3-0)

Introduction to Business—Survey of the place of business in society.

Business 250. (3-0; 3-0)

Business Principles—Survey of the functional areas of business.

Note: For Non-Commerce students only.

Business 300. (3-0; 3-0)

Administrative Principles—Functions of management-planning, organization, staffing, directing, controlling.

Business 306. (0-0; 3-3)

Business Statistics—The application of statistical methods to business problems with emphasis on prediction techniques, sampling, time series, and index numbers.

Prerequisite: Statistics 305 or consent of instructor.

Business 320. (3-0; 3-0)

Business Analysis—Internal and external factors influencing prices, costs, output and growth of a business enterprise. Developments in organization analysis.

Business 354. (3-0; 3-0)

Operations Analysis—Quantitative approach to Business problems. Theory and application.

Prerequisite: Mathematics 207, or equivalent.

Business 355. (3-0; 3-0)

Quantitative Methods—Introduction to analytical methods for business decisions.

Business 400. (3-0; 3-0)

Business Policy—A study of policy-making in business, government and social fields with emphasis upon the application of the principles and techniques, acquired in the basic courses, to comprehensive problems.

Business 470. (3-0; 3-0)

Government and Business—An examination of federal and provincial regulation of the economic system.

COMPUTING SCIENCE

Computing Science 351. (1-2; 1-2)

Electronic Data Processing—Introduction to punched-card procedure. Elementary programming concepts in basic machine language and compiler language. Commercial applications of computer techniques.

BUSINESS LAW

Business Law 310. (3-0; 3-0)

Commercial Law—An introduction to the study of Commercial Law with special reference to the law of contracts; Bills of Sale, Chattel Mortgages and conditional sales; sales of goods; bulk sales; contracts of hiring; contracts of carriage including bills of lading; negotiable instruments; guarantees; real property; commercial associations including companies, partnership and agency; master and servant.

ECONOMICS

Economics 200. (3-0; 3-0)

Principles of Economics—A survey of various aspects of economics: the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolostic conditions; selected topics in analysis and policy.

Prerequisite for all senior Economics courses except 310, 311, and 330.

Economics 300. (3-0; 3-0)

Micro-Economic Analysis—The theory of consumer behavior; price and output determination under competition monopoly and other market structures; the allocation of resources and resource pricing; the distribution of income.

Prerequisite: Economics 200 or 302.

Economics 320. (3-0; 3-0)

International Economics—The basis of international trade, balance of payments problems, and related matters or analyzed theoretically and in relation to questions of economic policy. The development of the international economy since 1500 is surveyed, with emphasis on events since the Second World War.

Prerequisite: Economics 200 or 302.

Economics 340. (3-0; 3-0)

Money and Banking—The principles of money, monetary systems, commercial banking, central banking, monetary theory and policy, foreign exchange.

Prerequisite: Economics 200 or 302.

Economics 350. (3-0; 3-0)

Public Finance—A study of the conditions under which individual economic goals can be maximized through non-market mechanisms. Problems in the allocation of resources, redistribution of income, and stabilization of the level of resource utilization. A framework for analyzing taxes and the goals of a tax system. Patterns and trends in government expenditure and revenues. Objects, principles, and techniques of compensatory fiscal and debt policies.

Prerequisite: Economics 200 or 302.

Economics 380. (3-0; 3-0)

Macro-Economic Analysis—National income concepts and determination; the theory of aggregate consumption and investment; business cycle and growth applications of aggregate analysis.

Prerequisite: Economics 200 or 302.

ENGLISH

English 210 (3-0; 3-0)

English Language and Literature—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Texts: To be announced:

FINANCE

Finance 302. (2-0; 2-0)

Business Finance—An introductory course in corporate financial decision making, and the administration of a going concern.

Finance 400. (3-0; 3-0)

Insurance Principles—Nature of risk and uncertainty and the methods of meeting risk. The insurance mechanism, including types of carriers, contracts, and legal problems.

Finance 410. (3-0; 3-0)

Investment Principles; Security Analysis—Theories of investment with special reference to types of securities, prices and market operation.

Analytical techniques in the selection of securities.

Finance 421. (3-0; 0-0)

Taxation and Estate Planning—Current estate planning practices, with particular references to life insurance, succession duties, corporate and personal income taxes.

Finance 431. (0-0; 3-0)

Real Estate—The valuation of real estate, concepts and methods. Real Estate financing, including leasebacks and tax implications.

Finance 450. (3-0; 3-0)

Appraisal and Assessment—Techniques and principles governing the valuation of real and personal property for commercial and tax purposes.

GEOGRAPHY

Geography 302. (3-0; 3-0)

Economic Geography—A study of the distribution of economic activities over the world. Resources, industries, and trade patterns are reviewed systematically and in place.

Geography 406. (3-0; 3-0)

Western Canada—A study of the resources, patterns of development and regions of Western Canada. The emphasis will be upon the developed parts of the Prairie Provinces and British Columbia.

Geography 410. (2L-1s; 2L-1s)

Geography in Planning—This course will cover selected historical, theoretical and practical aspects of land-use planning in various parts of the world. Physical and cultural aspects of planning projects and problems will be considered; techniques appraised.

Prerequisite: Consent of the instructor.

Geography 416. (3-0; 3-0)

Industrial Geography—A systematic geography focussing attention on manufacturing and raw materials transport, energy and markets in their areal context and in relation to manufacturing. Emphasis will be placed on the geographic analysis of the character of representative manufacturing areas including major manufacturing regions as well as underdeveloped territories.

Prerequisite: Geography 302 or consent of the instructor.

GEOLOGY

Geology 302. (3-3; 3-3)

Geology and Mineral Deposits of Canada—The study of the geologic regions of Canada; their stratigraphy, structure, and mineral deposits.

Prerequisite: Geology 201 or consent of department.

HISTORY

History 370. (3-0; 3-0)

Canada—A survey of the political and social history of Canada.

Prerequisite: A previous course in history or the consent of the department.

LANGUAGES OTHER THAN ENGLISH

French

French 100. (5-0; 5-0)

Beginners' French—French 100 is designed to enable students with complete matriculation but without French to begin their study of this language in the University.

Note: Normally, students will go from French 100 to French 200.

French 200. (3-1; 3-1)

First Year University French—This is an intensive course in reading modern French, French grammar and composition.

Prerequisite: Grade XII French or French 100.

German

German 100. (3-2; 3-2)

Beginners' German—This course is designed to impart, on the introductory level, an active, practical skill in the use of the spoken and written word. The oral approach will be stressed, using material from everyday life situations, easy cultural readers, slides, charts, maps etc. The Department's language laboratory will be used for drill purposes and will also be available to students for individual practice.

German 200. (3-1; 3-1)

First Year University German—This course is devoted to the development of the student's ability in speaking, reading and writing German, using modern short stories, cultural readers and visual aids.

Prerequisite: Matriculation German, German 100 or the equivalent.

Greek

Greek 100.

Beginners' Greek—First Greek Book (White: Ginn); A Greek Reader (Colson: Macmillan).

Italian

Italian 100. (5-0; 5-0)

Beginners' Italian—An introductory course in Italian grammar and pronunciation dealing with different aspects of Italian culture to provide a background for further studies.

Latin

Latin 100. (5-0; 5-0)

Beginners' Latin—This course is to enable students who enter the University without Latin to begin the study of this language in University. It is concerned with the essentials of grammar, syntax, the reading of easy Latin and prose composition. A secondary emphasis is placed on the connection of English with Latin.

Latin 200. (3-0; 3-0)

Latin Authors and Prose Composition—Hamilton and Carlyle, *Latin for Secondary Schools* (Gage); Wormald and Lyne, *Rogues' Gallery* (Cambridge); Vergil, *Aeneid,* Book IV (Sidgwick: Macmillan); Franklin and Bruce, *Latin Prose Composition* (Longman, Green and Co.).

For students with matriculation in Latin or with Latin 100.

Polish

Polish 100. (5-0; 5-0)

Beginners' Polish—This course is elementary and is designed to give a working knowledge of the Polish language. It provides a study of the essentials of grammar, reading, and drill on useful expressions.

Russian

Russian 100. (5-0; 5-0)

Beginners Russian (Arts Section)—This course is elementary and is designed to give a working knowledge of the Russian language. It provides a study of the essentials of grammar, reading, and drill on useful expressions.

Spanish

Spanish 100. (5-0; 5-0)

Beginners' Spanish—A first course in Spanish grammar and pronunciation; an introduction to Spanish and Hispano-American civilization.

Ukrainian

Ukrainain 100 (5-0; 5-0)

Beginners' Ukrainian—This course is elementary and is designed to give a working knowledge of the Ukrainian language. It provides a study of the essentials of grammar, reading and drill on useful expressions.

MARKETING

Marketing 302. (2-0; 2-0)

Fundamentals of Marketing—The evaluation of markets and marketing, market structures, organization and behavior.

Marketing 310. (3-0; 3-0)

Marketing Policies and Problems—Readings in the interdisciplinary contributions to marketing decision-making techniques and marketing analysis.

Marketing 400. (3-0; 3-0)

Distribution—Executive determination of organizational structure, policy making, control policies, and general management problems in wholesaling and retailing operations.

Marketing 410. (3-0; 3-0)

Sales Management: Purchasing—Sales analysis and forecasting, planning and policy determination, territorial and cost analysis. Problems faced in industrial procurement by various organizations.

Marketing 420. (3-0; 3-0)

Advertising: Marketing Research—The basic concepts of advertising and study of the underlying psychology. Problems faced in the design and execution of marketing research.

Marketing 432. (3-0; 3-0)

Advanced Marketing: Foreign Marketing—The integration of the marketing field at the top management level through case studies of marketing programs. Marketing functions, organization and structure in foreign trade.

MATHEMATICS

Mathematics 180. (4-0; 4-0)

Trigonometry and Polynomial Calculus—Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentiation and integration of elementary functions. Applications.

Prerequisite: Mathematics 30 or its equivalent.

Mathematics 207. (5-0; 5-0)

Elementary Calculus—Real numbers. Functions and graphs. Differentiation and applications. Analytical geometry. Integration and applications. Trigonometric, exponential and inverse functions.

Prerequisite: Mathematics 30 and 31 or their equivalent.

Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 207 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101.)

Mathematics 220. (3-0; 3-0)

Elementary Calculus—Differentiation and integration of trigonometric functions. Polar coordinates. Logarithmic and exponential functions. Conic sections. Areas and volumes.

Prerequisite: Mathematics 180.

Mathematics 250 (3-0; 3-0)

Theory of Finance—Application of percent, interest, annuities certain, sinking funds and amortizations, valuation of bonds, depreciation, and computer programming in finance.

Prerequisite: Mathematics 30.

PERSONNEL

Personnel 302. (2-0; 2-0)

Human Relations—A detailed study of work environment, motivation and morale and their influence on productivity. The practices and techniques of personnel management will be examined in terms of their effects on the organization and its employees.

Personnel 402. (3-0; 3-0)

Labour Legislation—An examination of the history, philosophy and significance of Federal and Provincial labour legislation.

Personnel 410. (3-0; 3-0)

Collective Bargaining—A detailed examination of negotiation techniques and of the day-to-day administration of the collective agreement.

Personnel 420 (3-0; 3-0)

Personnel Administration—An intensive examination of procedures for employee recruitment, selection, placement and training; job evaluation, merit rating, wage structure and employee communications.

PHYSICAL EDUCATION

Physical Education 218. (0-2; 0-2)

Recreational Activities—Emphasis on the fundamentals of the following recreational activities; Touch football, Borden ball, volleyball, badminton, basketball, tumbling, aquatics, circuit training, and golf. Course required of all first-year men.

Physical Education 228. (0-2; 0-2)

Recreational Activities—Emphasis on the fundamentals of the following recreational activities; Tennis, aquatics, badminton, volleyball, basketball, social dancing and golf. Course required of all first year women.

PHYSICAL SCIENCE

Physical Science 341. (3-0; 3-0)

Physical Science—A course designed for B.A. and B.Ed. students to give them some appreciation of fundamental ideas and methods in the physical sciences, of modern trends in this field, and of its relation to other disciplines. Illustrative material will be taken from Physics, Chemistry, Astronomy and Geology, and the history and development of the subject will be stressed.

Note: This course is not open to first year students and may not be taken for credit by students who have already taken Physics 100 or 200.

POLITICAL SCIENCE

Political Science 200. (3-0; 3-0)

Elements of Political Science—A study of the principles and practices of modern government, with emphasis on the democratic constitutional state. Among the topics studied are the nature and theory of the state; types of constitutions; the functions and composition of the legislature, executive and judiciary; representation; political parties and pressure groups.

Political Science 310. (3-0; 3-0)

History of Political Thought—A historical and critical survey of the development of political and social philosophy from Ancient Greece to the present time, with selected readings from major political writers.

Political Science 320. (3-0; 3-0)

Government of Canada—A study of the structure and functioning of the government of Canada, especially of the Commons, the Senate, the Cabinet System, the Civil Service; and the role of political parties.

PRODUCTION

Production 302. (2-0; 2-0)

Fundamentals of Production—An introductory study of production management.

Production 310. (3-0; 3-0)

Production Management—A study of production management with respect to the basic functional areas.

Produciton 400. (3-0; 3-0)

Quantitative Analysis for Management—A quantitative approach to decision-making in management.

Production 410. (3-0; 3-0)

Plant Location, Layout, Organization and Control—A study of the factors influencing plant location, layout, organization, and control.

Production 421. (0-0; 3-0)

Motion and Time Study—Motion and time study techniques.

Production 430. (3-0; 3-0)

Advanced Production Management—Advanced problems in planning and controlling production operations.

PSYCHOLOGY

Psychology 202. (2-2; 2-2)

Introduction to General Psychology—A survey of problems, methods and principles in various fields of psychology.

Psychology 320. (3-0; 3-0)

Psychology Applied to Business and Industry—Methods and results of psychological studies in such fields as:

(a) selection, placement, training and supervision of personnel;
(b) promotion of efficiency and safety in production;
(c) advertising, selling and consumer research.

SOCIOLOGY

Sociology 202. (3-0; 3-0)

Introductory Sociology—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior.

Sociology 320. (3-0; 3-0)

Social Problems—An analysis of deviant behavior (e.g. crime, juvenile delinquency, drug addiction) and an analysis of social disorganization including world population crisis, urban and rural problems, industrial and other problems.

Sociology 390 (3-0; 3-0)

Industrial Sociology—A sociological analysis of the industrial system; industrial bureaucracy; the industrial roles of executives, specialists, foremen, office and plant workers; formal and informal groups; social structure of trade unionism; management-labour relations; industry in relation to social stratification, minority groups, family, government, technological and social change. Field trips to local industries.

Sociology 460. (3-0; 3-0)

Social Organization—Theories of social organization, analysis of such forms of social organization as kinship groups, bureaucracy, economic systems, science, etc., and their interrelationship in functioning social systems.

Prerequisite: A first course in sociology.

STATISTICS

Statistics 305. (3-3; 0-0) or (0-0; 3-3)

Introductory Statistics—Tabulation, graphical representation and reduction of data. Measures of location and dispersion. Elementary probability. Binomial and normal distributions. Curve fitting and the chi-square test of goodness-of-fit. Elements of sampling. Testing statistical hypotheses, confidence intervals.

Prerequisite: Mathematics 30.

X

The School of Dental Hygiene

INFORMATION, REGULATIONS, COURSES

(1) GENERAL INFORMATION

At the request of the Government of Alberta, a two year program of training for Dental Auxiliaries was initiated within the Faculty of Dentistry, University of Alberta, in 1961. The teaching and training follows closely the requirements for Dental Hygiene with additional study in the subjects necessary for Dental Auxiliaries.

Students enrolled in the Dental Auxiliary program receive financial assistance from the Department of Public Haelth. Graduate Dental Auxiliaries are employed by the local health authority to serve with dental health teams. A two year return in service for financial assistance received is required of all graduate Dental Auxiliaries.

In 1962, a School of Dental Hygiene was established. The two year program for Dental Auxiliaries is now offered within the School. A two year program of study for Dental Hygienists leading to a Dental Hygiene diploma is also offered.

The School of Dental Hygiene is located in the Medical Sciences Building on the University of Alberta Campus in Edmonton. The Dental Hygiene Clinic is equipped with modern facilities and affords the students an opportunity to apply knowledge, learned skills and techniques for the improvement of dental health. The services offered in the Dental Hygiene Clinic are available by appointment to all students on the University of Alberta Campus and citizens of Edmonton and surrounding districts.

Licensure

A diploma from the School of Dental Hygiene does not, in itself, confer the right to practise. Dental Auxiliaries employed in the local health units of Alberta must be registered and obtain a licence to practise as described in The Dental Auxiliaries Act of the Province of Alberta. A Dental Hygienist desiring to practise Dental Hygiene in Canada should consult the appropriate provincial licensing body as listed below:—

Alberta—Registrar, Alberta Dental Association, 9901-108 Street, Edmonton, Alberta.

British Columbia—Registrar, College of Dental Surgeons of British Columbia, 325-925 W. Georgia Street, Vancouver, British Columbia.

Manitoba—Registrar, The Manitoba Dental Association, 308 Kennedy Street, Winnipeg, Manitoba.

New Brunswick—Registrar, College of Dental Surgeons of New Brunswick, 158 Germaine Street, St. John, N.B.

Newfoundland—Registrar, Newfoundland Dental Association, Campbell Building, 350 Water Street, St. John's, Newfoundland.

Nova Scotia—Registrar, Provincial Dental Board of Nova Scotia, 269 Cottingen Street, Halifax, Nova Scotia.

Ontario—Registrar-Secretary, Royal College of Dental Surgeons of Ontario, 230 St. George Street, Toronto 5, Ontario.

Prince Edward Island—Registrar, The Dental Association of Prince Edward Island, 162 Great George Street, Charlottetown, Prince Edward Island.

Quebec—Registrar, College of Dental Surgeons of the Province of Quebec, 2285 Avenue Papineau, Montreal, P.Q.

Saskatchewan—Registrar, The College of Dental Surgeons of Saskatchewan, 606 Canada Building, Saskatoon, Saskatchewan.

Dental Hygienists and Dental Auxiliaries are employed at all times under the supervision or direction of a fully qualified dentist.

Fees

See PART IV.

Uniforms

The student will be expected to have three lab. coats, two white uniforms and a pair of white oxfords. The lab. coats, uniforms and shoes will be purchased under the direction of the school.

Approximate Cost of Books

First year	$ 80.00
Second year	25.00

Approximate Cost of Instruments and Uniforms

First year	$150.00
Second year	15.00

Dental Auxiliary Bursary

A limited number of Public Health bursaries are available to students enrolled in the School of Dental Hygiene. Students receiving the bursaries will take the Dental Auxiliary program. Graduate Dental Auxiliaries will be expected to work for a two year period following graduation in designated health units of Alberta. Candidates who are residents of Alberta will be given priority to receive the financial assistance.

The financial assistance consists of $75.00 a month during the academic years, tuition fees and a book allowance of approximately $25.00. Applicants eligible to receive the bursary will be notified after Registration has been completed for the School of Dental Hygiene. All forms for the bursary will be available and completed on the day of the registration.

(2) ADMISSION AND REGISTRATION

The programs of study are open to men and women but are particularly suited to young women. There is no minimum age requirement. Admission requirements for the School of Dental Hygiene are:

(a) a High School Diploma (Senior Matriculation) with

(b) a "B" or higher standing in the required courses of Grade XII. The required courses are as follows:—

(1) English 30

(2) Social Studies 30

(3) Chemistry 30

(4),(5),(6) Three to be selected from:
Physics 30
Mathematics 30
Biology 30 (or 32 until Sept. 1965)
French 30 or German 30 or Latin 30 or another language at an equivalent level.

(c) an average in the six courses of at least 60%.

It is recommended that Biology 30 be selected as one of the optional subjects.

Students who have matriculated outside of the Province of Alberta and are seeking admission to the School of Dental Hygiene, must have a standing equivalent to the above mentioned requirements. No student will be accepted on a conditional standing.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any student. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to obtain nominal entrance requirements at the University of Alberta.

Enrolment in the School of Dental Hygiene is limited. Candidates will be selected according to academic standing. Consideration will be given to satisfactory personality and physique. Wherever possible, applicants should arrange a personal interview with the Director of the School prior to registration.

Registration

The Admissions Committee meets to consider all applications to the School of Dental Hygiene on or about the 20th of August. During the following week, applicants will be informed whether they have been accepted or not. Registration for all students in the School of Dental Hygiene will be on the Thursday immediately following Labor Day. Each applicant accepted for admission to the School of Dental Hygiene will receive notification of admission indicating the time and place of registration.

Students should therefore not come to the University until they have received an official acceptance of their application.

(3) PROMOTION AND GRADUATION

Students should read carefully the regulations concerning attendance, examinations and promotions. These, as well as the following, apply to all students in the School of Dental Hygiene.

The records of all students will be reviewed at the end of each academic year by the Revisions Committee of the Faculty of Dentistry and the Council of the School. Recommendations for promotion and graduation will be based on a grade of at least 50% in each subject and a weighted average of at least 60%. For the purpose of reaching an average mark in the work of each year, a system for determining a weighted average has been adopted. Information on this system is available from the office of the Director. Students in the Dental Auxiliary program must satisfactorily complete the field training work.

Permission to write one or more supplemental examinations is at the discretion of the Revisions Committee and the Council of the School. Each

case will be considered on the student's yearly performance and academic average. Because of early registration, a student may be admitted conditionally to the second year of study pending the results of supplemental examinations written in the month of August or September. If the first year deficiencies are not cleared by October 1, a student may be asked to repeat the first year or to withdraw from the School.

(4) PROGRAMS OF STUDY

(a) *Dental Auxiliary Program*

FIRST YEAR

Subject	Course No.	Hours
Public Speaking	Public Speaking 201	32
Introductory Sociology	Sociology 202	80
Dental Anatomy	Dental Hygiene 203	80
Psychology	Dental Hygiene 204	48
Dental Roentgenology	Dental Hygiene 205	16
English	English 210	80
Office Assistance and Administration	Dental Hygiene 211	64
Clinical Dental Hygiene	Dental Hygiene 212	256
Anatomy and Physiology	Dental Hygiene 213	128
Nutrition	Dental Hygiene 220	32
Food and Biochemistry	Biochemistry 221	80
Oral Histology and Embryology	Dental Hygiene 222	48
Dental Materials	Dental Hygiene 223	64
Physical Education		56
Total		1080

Field Training

First year Dental Auxiliary students have a two week orientation and field training period with the Provincial Department of Health and designated health units of Alberta. This field work will follow the examinations period in May.

SECOND YEAR

Subject	Course No.	Hours
Educational Foundations	Educational Foundations 301	96
Pathology	Dental Hygiene 302	48
Bacteriology	Dental Hygiene 304	80
Pharmacology	Dental Hygiene 305	32
Office Assistance and Administration	Dental Hygiene 311	64
Clinical Dental Hygiene	Dental Hygiene 312	272
Preventive Dentistry	Dental Hygiene 313	144
Dental Roentgenology	Dental Hygiene 315	64
Dental Health Education	Dental Hygiene 321	48
Dental Public Health	Dental Hygiene 322	32
Ethics and Jurisprudence	Dental Hygiene 323	16
First Aid and Safety Education	Dental Hygiene 324	32
Total		928

(b) *Dental Hygiene*

FIRST YEAR

Subject	Course No.	Hours
Public Speaking	Public Speaking 201	32
Introductory Sociology	Sociology 202	80
Dental Anatomy	Dental Hygiene 203	80
Psychology	Dental Hygiene 204	48
Dental Roentgenology	Dental Hygiene 205	16
English	English 210	80
Office Assistance and Administration	Dental Hygiene 211	64
Clinical Dental Hygiene	Dental Hygiene 212	256
Anatomy and Physiology	Dental Hygiene 213	128
Nutrition	Dental Hygiene 220	32
Food and Biochemistry	Biochemistry 221	80
Oral Histology and Embryology	Dental Hygiene 222	48
Dental Materials	Dental Hygiene 223	64
Physical Education		56
Total		1080

SECOND YEAR

Subject	Course No.	Hours
Educational Foundations	Educational Foundations 301	96
Pathology	Dental Hygiene 302	48
Bacteriology	Dental Hygiene 304	80
Pharmacology	Dental Hygiene 305	32
Office Assistance and Administration	Dental Hygiene 311	64
Clinical Dental Hygiene	Dental Hygiene 312	272
Preventive Dentistry	Dental Hygiene 313	144
Dental Roentgenology	Dental Hygiene 315	64
Dental Health Education	Dental Hygiene 321	48
Dental Public Health	Dental Hygiene 322	32
Ethics and Jurisprudence	Dental Hygiene 323	16
First Aid and Safety Education	Dental Hygiene 324	32
Total		928

(5) DETAILS OF COURSES

The University reserves the right to modify or withdraw any of the courses here outlined.

Students are reminded that regular attendance is expected in all courses.

NOTE: The hours of instruction per week for both terms of the winter session are shown at the top of each course description. The first figure in each term indicates lecture-hours and the second figure laboratory-hours. The letter "c" attached to a figure signifies clinic hours.

STAFF:—

Assistant Professor and Director of the School—Miss Margaret Berry

Lecturer—Mrs. J. C. Morrison

Instructors—Mrs. J. Sikora, Miss J. Rask, Miss L. Pollard

Members of the Faculties of—Dentistry, Arts, Agriculture and Education and of the Department of Bacteriology

Public Speaking 201—Dean F. C. Bentley, Faculty of Agriculture (1-1; 0-0)

Public Speaking—A series of lectures on essentials and procedures in public speaking. The development of confidence before audiences by student participation in the preparation and presentation of short talks.

Sociology 202 (3-0; 3-0)

Introductory Sociology—An introductory analysis of the nature of society, the interrelationships of its component groups, and the process whereby society persists and changes. Society is analyzed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior.

Dental Hygiene 203—Dr. G. B. Davidson, Faculty of Dentistry (2-3; 0-0)

Dental Anatomy—A lecture and laboratory course designed to teach the student how to recognize, describe and reproduce tooth forms. The course will cover the structure, function and morphology of the teeth.

Dental Hygiene 204—Mrs. D .D. Watson, Student Counselling Services (3-0; 0-0)

Psychology—An introduction to Psychology, its material and fundamental laws, application and relations to other sciences with particular reference to children—habit formation, emotions, thinking, individual differences, learning, adjustment and motivation.

Dental Hygiene 205—Dean H. R. MacLean, Faculty of Dentistry (1-1c; 0-0)

Dental Roentgenology—A course in the fuudamental and elementary principles of dental roentgenology. The student will be required to spend time in the clinic learning the technical aspects of x-rays, i.e., the taking of, processing and mounting of x-rays.

English 210—Department of English, Faculty of Arts (3-0; 3-0)

English Language and Literature—A course designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Dental Hygiene 211—Miss M. Berry (2-0; 2-0)

Office Assistance and Administration—The course of study will continue throughout the two years of training and will relate theory and acquired knowledge from all phases of the Program. The procedures of patient contact and management, chair side assisting, general office administration, economics, bookkeeping and patient counselling will be considered.

Dental Hygiene 212—Miss M. Berry and Associates (2-7; 0-7c)

Clinical Dental Hygiene—A lecture, pre-clinical and clinical course of training given throughout the two years. The course will cover the techniques of oral prophylaxis and patient education. The student will become familiar with the techniques of topical applications for the prevention of caries. The history and types of tooth brushes, tooth brushing methods and chair side instruction in proper oral hygiene will be studied.

Dental Hygiene 213—Dr. G. H. Sperber, Faculty of Dentistry (2-2; 2-2)

Anatomy and Physiology—A lecture and laboratory course designed to provide a basic knowledge of anatomy and an understanding of the normal functions of the human body.

The following systems will be covered:—

circulatory, respiratory, digestive, reproductive, endocrine, skeletal, nervous, urinary and excretory. A more concentrated study will be made of the structures of the head and neck with special emphasis on the functions of the oral cavity, mastication, speech, swallowing, etc.

Dental Hygiene 220—Mrs. K. Davidson, Faculty of Dentistry (0-0; 2-0)

Nutrition—A course of instruction in the general food requirements for growth, maintenance and repair of the body. Coverage of carbohydrates, fats, proteins, vitamins, minerals and water and their relation to dental health. Individual diet assessment and counselling and the application of this and nutrition factors in dental health education.

Biochemistry 221—Dr. J. deMan, Faculty of Agriculture (0-0; 2-3)

Food and Biochemistry—A lecture and laboratory course with an introductory review of inorganic and organic chemistry to facilitate the understanding of the basic biochemistry. Emphasis to be placed on food chemistry and its application in dentistry.

Dental Hygiene 222—Dr. K. A. McMurchy, Faculty of Dentistry (0-0; 2-1)

Histology—Oral and Embryology—A lecture and laboratory course to provide a general knowledge of the elementary body tissues and structures. Particular emphasis will be placed on the development and structural characteristics of the head, face, oral cavity and teeth.

Dental Hygiene 223—Dr. C. Duke, Dr. S. Fleming, Faculty of Dentistry (0-0; 1-3)

Dental Materials—A lecture and laboratory course to provide a general knowledge of materials (their properties, the preparation and manipulation) used in dentistry. The course will include impression compounds, gypsum and stone, inlay wax, investing and casting, alloys—gold and amalgam, cements.

Educational Foundations 301 (3-3; 0-0)

Dr. K. N. Thompson, Professor S. A. Earl, Faculty of Education

Introduction to Education—A course designed to give the student a general knowledge of the history of education. The various influences that have shaped and changed educational beliefs and philosophy; political, economic, social and religious. Reference to the growth and development of education in Canada and in the Province. Observation and practical teaching experience.

Dental Hygiene 302—Dr. K. A. McMurchy (2-1; 0-0)

Pathology—A lecture and laboratory course to introduce general pathology with consideration given to the more common diseases affecting the human body. Clinical pathology of the diseases affecting the teeth and their supporting structures including consideration of oral manifestations of selected systemic disturbances. A knowledge of visual differentiation between normal and abnormal tissues, the ability to recognize normal and abnormal occlusion. A knowledge of the physiological and pathological changes which affect the gingiva and the ability to recognize lesions of the hard and soft structures of the oral cavity.

Dental Hygiene 304—Dr. G. E. Myers, Department of Bacteriology (3-2; 0-0)

Bacteriology—A lecture and demonstration course to give an understanding of the general principles involved in the study of micro-organisms with special emphasis on their application to the dental field. Consideration will be given to the classification and differentiation of microorganisms, methods of isolation, growth and identification. General principles of asepsis, antisepsis and antibiosis and immunity will be discussed. Reference will be made to the epidemiology of diseases and the precautionary measures used to prevent the transmission of communicable diseases.

Dental Hygiene 305—Mrs. J. C. Morrison (2-0; 0-0)

Pharmacology—A general knowledge of drugs by groups—uses, therapeutic action, dosage, etc. A knowledge of weights and measures and prescription writing. Special emphasis will be placed on the basic drugs used in dentistry, the physical and chemical properties and their effect on the human body. A knowledge of dental anaesthetics—topical, local, general, antibiotics, sterilizing agents, astringents, emollients, antiseptics, basic anodynes, hemostatics, sedatives, stimulants, vasoconstrictors, dentifrices, dental adhesive products, detergents, mouth washes.

Dental Hygiene 311—Miss M. Berry and Associates (1-0; 0-3)

Office Assistance and Administration—A continuation of the first year course, Office Assistance and Administration 211. The student will receive practical experience in assisting by working with the dental student on the clinic floor. The practical application of procedures for dental patient contact and management, administration, and patient counselling will also be received in the dental hygiene clinic.

Dental Hygiene 312—Miss M. Berry and Associates (0-7c; 0-10c)

Clinical Dental Hygiene—A continuation of the first year dental hygiene course. The second year will be devoted to clinical experience.

Dental Hygiene 313—Members of the Faculty of Dentistry (2-0; 1-6)

Preventive Dentistry—Lecture, laboratory and clinical observation periods in the various divisions of the dental field. The preventive point of view will be stressed in operative and restorative dentistry, periodontics, orthodontics, pedodontics, oral diagnosis, oral surgery, hospital and home care, institutions and industry. The course will also include a series of 15 lectures and seminars in the pedodontic division to acquaint the students with the dynamic process of

mental and physical growth of children in order that they can better understand behavior of children in the dental situation.

Dental Hygiene 315—Dr. H. R. MacLean, Faculty of Dentistry (0-2; 0-2)

Dental Roentgenology—The fundamental and elementary principles of dental roentgenology were covered in the course "Dental Roentgenology 205". During the second year of training, the student wil lbe required to spend time in the clinic learning the technical aspects of x-rays, i.e., the taking, processing and mounting of x-rays.

Dental Hygiene 321—Miss M. Berry (0-0; 3-0)

Dental Health Education—A lecture course designed to give a basic knowledge of technique used in dental health education. The course will consider methods and available materials for dental health education, the preparation and presentation of dental health education, the preparation and presentation of dental health education for various age or interest groups in the school and community. The course will include the use of audio visual aids and it is expected that the student will have a working knowledge of a variety of these audio visual aids. The student will be expected to make critical reviews on various types of dental health education material available to the public as well as prepare papers on Dental topics for class discussion.

Dental Hygiene 322—Dr. C. W. B. McPhail, Faculty of Dentistry (0-0; 3-0)

Dental Public Health—A lecture course outlining the historical and philosophical background of public health, traces the history of dentistry and details the function of dentistry in public health services. The role of the dental health team is related to the concept of community dental health.

Dental Hygiene 323—Miss M. Berry (0-0; 1-0)

Ethics and Jurisprudence—A lecture course designed to give the Dental Auxiliary and the Dental Hygienist a thorough understanding of her own profession and her relations to the profession and practice of dentistry. The course will include a study of ethics, jurisprudence and history of dentistry, dental hygiene and the dental auxiliary.

Dental Hygiene 324—Miss M. Berry (0-0; 1-1)

First Aid and Safety Education—The course includes instruction and practice in the basic principles of first aid as established by St. John Ambulance Association. Safety education about the home, school and community with particular reference to the prevention of accidents that are injurious to the teeth and face will be covered.

XI

The Faculty of Dentistry

INFORMATION, REGULATIONS, COURSES

(1) (a) ACADEMIC STAFF OF THE FACULTY OF DENTISTRY

Professors Emeritus—H. E. Bulyea, W. S. Hamilton, S. D. Fraser.

Professors—R. V. Blackmore, C. R. Castaldi, A. D. Fee, H. R. MacLean (Dean of the Faculty), K. A. McMurchy, J. Tuba.

Associate Professors—G. B. Davidson, S. G. Geldart, G. H. Gibb, R. D. Haryett, D. G. MacGregor, C. W. B. McPhail (Assistant to the Dean), D. R. Stewart, R. S. Van Alstine.

Assistant Professors—B. J. Eastwood, D. H. MacDougall, P. D. MacRae, R. C. McClelland, R. P. Mullen, H. L. Samuels, G. H. Sperber.

Lecturers—D. M. Collinson, Mrs. K. M. Davidson, G. A. Deane, R. E. Donnelly, C. E. Filipchuk, S. Fleming, D. E. Florence, R. B. Hager, A. H. Lane, Z. M. Pawliuk, F. D. Read, R. C. Sills, M. G. Strelioff, A. R. Urschel.

Sessional Lecturers—A. Borkent, D. M. Buchanan, W. A. Buck, K. A. Burnham, J. M. Calvert, R. B. Cameron, E. Clark, R. L. Costigan, C. G. Duke, G. D. Enns, J. G. Geddes, C. L. Gullekson, J. Hardy, L. Heppler, T. E. Jones, S. S. Kucey, B. L. Kuzyk, V. C. Kuzyk, J. S. Little, V. M. Lloyd, R. S. Margolis, J. E. L. Mathieson, D. C. McKechnie, W. C. Meyer, C. W. Olsen, F. L. Peterson, A. E. Retzlaff, J. M. Shields, J. Sikora, E. A. Stang, A. C. Thompson, J. M. Venne, G. P. Wysocki, J. E. M. Young.

Research Associate—W. Zacherl.

Honorary Members—J. W. Clay, C. H. Husband, H. B. Ness, W. A. Quigley.

(b) ACADEMIC STAFF OF THE SCHOOL OF DENTAL HYGIENE

Assistant Professor—Miss M. Berry (Director).

Lecturer—Mrs. J. Morrison

Instructors—Miss L. E. Pollard, Miss J. Rask, Mrs. J. Sikora

(2) INTRODUCTION AND GENERAL INFORMATION

Dental training was instituted at the University of Alberta in 1917 in the School of Dentistry under the Faculty of Medicine. The first full degree program was offered in 1923, and the first class graduated in 1927. The School became the Faculty of Dentistry in 1944. Dental Auxiliary training was instituted in 1961. In 1962 the School of Dental Hygiene came into being and now offers both the Dental Auxiliary and Dental Hygiene programs. A program of graduate studies was formally approved in 1962.

The Faculty is located in the Medical Sciences Building. Lectures and laboratory instruction in such subjects as Anatomy, Chemistry, Physiology, Bacteriology, Histology, Psychiatry, Pathology, Pharmacology, Medicine, Surgery and

General Anaesthesia are offered in those departments. The dental sciences lectures, laboratories, seminars and clinics provide the student with an opportunity to relate and integrate these disciplines with his clinical knowledge, skills and performance under conditions very similar to those of practice.

In addition to bedside and operating clinics in Medicine and Surgery, the senior students are assigned to the Dental Department and the Department of General Anaesthesia at the University Hospital, which is located three blocks away. It has its dental staff, and dentistry is represented on the hospital advisory board. Thus the student is afforded an opportunity to relate his field of health services to the general field of medicine.

The aims and purposes of the Faculty are:—

(a) to attract and select suitable and well qualified young men and women for dentistry;

(b) to provide the professional leadership, the facilities and the atmosphere which will encourage, stimulate and allow each student to develop his full potential in any chosen aspect of his future professional career, whether it be in private practice, a specialty, teaching or research;

(c) to graduate competent and well-trained dentists prepared for a role of leadership and service in their profession and in their community; and

(d) to provide the opportunity and stimulus for continued learning through short post-graduate, graduate and research programs.

Registration and Fees

(a) For schedule of fees and general information see Parts I-IV.

(b) In the matter of admission to the first year in Dentistry each applicant, when notified that his application has been accepted, shall within a period of fifteen days of the date of notification, **make a deposit in the sum of fifty dollars** with the Bursar, University of Alberta, Edmonton, which amount will be later either (a) applied on his fees if he registers, (b) refunded in full if the applicant is unable to register and notifies the Registrar of this fact not later than July 15th of the year of application, or (c) forfeited in full if the applicant fails to register or neglects to notify the Registrar of his change of intention on or before July 15th.

Licensing

The Faculty is approved by the Council on Dental Education of the Canadian Dental Association and the American Dental Association.

Graduates in dentistry from the University of Alberta may register in the Province of Alberta upon payment of a licensing fee. They are also eligible to write the examinations of the National Examining Board of Canada, provided they have taken all their training in schools recognized by the Council on Dental Education, Canadian Dental Association. They are also eligible to write licensing examinations in some of the states in the United States and the National Board Dental Examinations of the American Dental Association.

Graduate Study Program

The Faculty of Dentistry has research laboratories and instructional facilities for a limited number of graduate students proceeding to the M.Sc. degree.

Dental graduates may undertake graduate programs in either basic science or clinical science. Students without dental qualifications, but who hold a B.Sc. degree in biological or physical science are eligible for graduate work in the division of basic research in Dentistry. For additional information regarding graduate programs, please consult the calendar of the Faculty of Graduate Studies.

Inquiries should be directed to the Chairman, Committee on Graduate Studies, Faculty of Dentistry, University of Alberta, Edmonton, Alberta.

Continuing Education

Courses are offered by various Departments from time to time to provide a program of continuing education for the graduate dentist.

Library

Within the new library building is a Medical Sciences Reading Room which contains medical and dental books and periodicals.

A dental library committee made up of the librarian, members of the faculty and representatives of the profession is responsible for keeping the book collection up-to-date.

In addition to the reference materials and textbooks on dentistry and related disciplines, the reading room contains over 115 current English and foreign language dental journals. A copy of the "Index to Dental Periodical Literature" is available to assist the librarian, students and the profession in locating information upon any subject. It is an index to all dental periodicals since 1839.

Student Guidance

Students in all years are assigned to faculty consultants, who will act as their special counsellors during their University course. These counsellors are appointed by the Dean of the Faculty.

Medical Examination

All students entering the University of Alberta for the first time are required to take a medical examination at the time of registration.

Students entering first-year dentistry are required to provide a certificate signed by themselves and a physician giving the details of their physical condition.

School of Dental Hygiene

The School of Dental Hygiene in the Faculty of Dentistry provides a two-year academic program of theoretical and professional training leading to a Diploma in Dental Hygiene. This program is approved by the Council on Dental Education of the Canadian Dental Association. Graduates are eligible to practise in any province of Canada, subject to the fulfillment of the requirements of the respective provincial licensing bodies.

Admission requirements for the School of Dental Hygiene are a High School Graduation Diploma (Senior Matriculation) with a "B" or higher standing in the required courses of Grade XII, and an average in these courses of at least 60%. The required courses are as follows: English 30, Social Studies 30, Chemistry 30, and **three** of Mathematics 30, Physics 30, Biology 30 (or 32), and

a foreign language. It is strongly recommended that Biology be taken by a prospective student.

Dental Auxiliary Program

The Government of the Province of Alberta offers a limited number of bursaries to students enrolled in the School of Dental Hygiene. The bursary consists of tuition fees, subsistence allowance of $75.00 a month during the academic years, and a book allowance of approximately $25.00. Bursaries are awarded primarily to residents of Alberta and on academic achievement. The bursary awards will be made after the completion of registration in the School of Dental Hygiene in the Fall. Students accepting the bursaries will follow the two-year Dental Auxiliary program. They will be expected to work in local Health Units of Alberta for a two-year period following graduation, as a return of service for the financial assistance received.

Detailed information on the Dental Hygiene program or the Dental Auxiliary program may be obtained from the School of Dental Hygiene Calendar, or by writing to the Director, School of Dental Hygiene, Faculty of Dentistry, University of Alberta, Edmonton, Alberta.

(3) ADMISSION REQUIREMENTS FOR THE D.D.S. PROGRAM

Matriculation

Students from the high schools of Alberta seeking admission into the Faculty of Science for Dentistry will be required to present:

(a) a high school diploma with

(b) "B" or higher standing in:

1. English 30,
2. Social Studies 30,
3. Mathematics 30,
4. Chemistry 30,
5. Physics 30,
6. French 30 or German 30 or Latin 30 or another language at an equivalent level;

(c) an average in these six courses of at least 60.0%.

Candidates from outside Alberta will be required to meet equivalent standards.

The above, plus at least one pre-professional year in the Faculty of Science, constitutes matriculation into the first year of the professional program in dentistry, leading to the degree of Doctor of Dental Surgery (D.D.S.).

Note: Students who completed Grade XII in 1954 or earlier will be given full consideration for admission. They are advised to write or see the Registrar of the University and to provide a complete transcript of their high school records.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any student. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

(4) PROMOTION

1. A student in the program leading to the degree D.D.S. should pass all subjects and obtain an average of at least 65% in the work of the pre-professional year, in the Faculty of Science, before proceeding to the program in dentistry.
2. Dentistry is on a year system; students must complete each year before being promoted.
3. Students will be permitted to repeat first year dentistry only in exceptional cases as determined by the Council of the Faculty of Dentistry and on the understanding that the requirement for promotion to second year for repeating students will be a weighted average of 65%.
4. A student permitted to repeat a failed year, who does not produce a satisfactory record in his first term examinations in the repeated year, will be required to withdraw from the Faculty and will be denied further registration in the Faculty.
5. Students in the Faculty of Dentistry are required to obtain a mark of 50% in each written paper and a weighted average of 60% in all written papers.

(5) PROGRAM OF STUDY

The Program Leading to the Degree of D.D.S.

Registration

Graduates in dentistry from the University of Alberta may register in the Province of Alberta upon payment of a licensing fee. Those wishing to practise in any other province should secure from the dental registrar of that province all information respecting the practice of dentistry. In some instances an enabling certificate is required before beginning the course of studies.

Enrolment in any faculty or school must necessarily be limited to the number of students who can be accommodated. Students are normally accepted in the order of their academic standing from among the whole list of applicants.

Students, therefore, should never come to the University until they have received an official acceptance of their application.

All students wishing to enter *the first professional year of dentistry are required to make application on or before May 14. Residents outside Canada must make application on or before April 15.* A student proceeding towards a first degree will normally be required to attend at least one academic year as a full-time student. In general, consideration for admission to the limit of available accommodation will be given to those students with an average of at least 65% in all courses taken after senior matriculation.

It must be distinctly understood that no student can be guaranteed admission to dentistry on the basis of academic standing alone. Before final acceptance any applicant may be required to satisfy representatives of the faculty at a personal interview. The possession of personal qualities necessary for successful practice will be stressed. Further, any student whose performance in the work of any professional year is unsatisfactory to the faculty will not be permitted to continue in the study of dentistry.

Program Requirements

(a) *Pre-professional*

A student may not enter this course unless (a) he has obtained an average of at least 60% in senior matriculation; (b) his registration is approved by the Faculty of Dentistry.

The basic minimum pre-professional requirement for the course leading to the D.D.S. degree is offered by the Faculty of Science and consists of one full year of college work after senior matriculation including full college courses in Inorganic Chemistry, Organic Chemistry and Zoology. (Refer to Academic Schedule for last day of application for admission to Faculty of Science.)

The subjects in the pre-professional year in the Faculty of Science are:

Chemistry 230,
Chemistry 250,
Physical Education,
Zoology 221,
One Humanities option (English 210 recommended),
One Social Sciences option (Psychology 202 recommended).

Priority will be given to those having the recommended options.

(b) *Professional*

Prescription of Courses

FIRST YEAR

Subjects	Course No.	Hours of Instruction Per Week
Anatomy—		
General and Neuroanatomy	Anat. 412	3-4; 3-4
Microscopic	Anat. 416	3-4; 3-4
Biochemistry	Biochem. 412	3-3; 3-3
Physiology	Physiol. 451	4-3; 4-0
Orientation, History and Ethics	Dent. 411	1-0; 0-0
Oral Anatomy	Dent. 413	2-6; 1-3
Community Dental Health	Dent. 414	0-0; 1-0
Dental Materials	Dent. 419	1-0; 1-0

SECOND YEAR

Subjects	Course No.	Hours of Instruction Per Week
Anthropology	Anat. 421	0-0; 1-0
[1]Bacteriology	Bact. 422	3-3; 1-3
General Pathology	Path. 422	4-2; 0-0
Pharmacology	Pharm. 470	2-3; 0-0
Psychodynamics	Psychiatry 420	0-0; 1-0
Full Denture Prosthesis	Dent. 420	2-6; 1-3
Removable Part. Dent. Prosth.	Dent. 421	1-3; 0-0
Fixed Partial Denture	Dent. 422	0-0; 1-3
Operative Dentistry	Dent. 423	1-6; 1-3
Oral Pathology	Dent. 424	0-0; 1-2
Pedodontics	Dent. 425	1-0; 0-0
Oral Diagnosis	Dent. 426	1-0; 1-0
Oral Hygiene and Prophylaxis	Dent. 427	1-0; 0-0
Local Anaesthesia	Dent. 428	0-0; 1-0
Orthodontics	Dent. 430	1-0; 0-0

1. Delete for the 1964-65 session only.
2. Add "Biochemistry 412 (3-3; 3-3)" and "Physiology 451 (4-3; 4-0)" for the 1964-65 session only.

THIRD YEAR

Subjects	Course No.	Hours of Instruction Per Week
Medicine	Med. 434	1-0; 0-0
Surgery	Surg. 434	0-0; 1-0
Full Denture Prosthesis	Dent. 440	1-6c; 1-6c
Preventive & Community Dentistry	Dent. 441	1-0; 1-0
Fixed Part. Dent. Prosthesis	Dent. 442	1-6; 0-3c
Operative Dentistry	Dent. 443	1-6c; 1-8c
Endodontics	Dent. 444	1-2; 0-1c
Pedodontics	Dent. 445	1-2; 1-3c
Oral Diagnosis and Pathology	Dent. 446	1-0; 1-0
Periodontics	Dent. 477	1-2; 0-0
Oral Surgery	Dent. 448	1-1c; 0-1c
Dental Therapeutics	Dent. 449	0-0; 1-0
Orthodontics	Dent. 450	1-2; 1-2
Ethics and Jurisprudence	Dent. 451	1-0; 0-0
Practice Management	Dent. 452	0-0; 1-0

1. Add "Pharmacology 470 (2-3; 0-0)" for the 1964-65 session only.

FOURTH YEAR

Subjects	Course No.	Hours of Instruction Per Week
General Anaesthesia	Med. 443	0-0; 1-0
Denture Prosthesis	Dent. 460	1-6c; 1-6c
Fixed Part. Dent. Prosth.	Dent. 462	1-4; 0-5
Operative Dentistry	Dent. 463	1s-7c; 1s-8c
Endodontics	Dent. 464	0-1c; 0-1c
Pedodontics	Dent. 465	1s-3c; 1s-3c
Pathology Diagnosis Seminar	Dent. 466	1s-3c; 1s-3c
Periodontics	Dent. 467	1-3c; 1-3c
Oral Surgery	Dent. 468	1-3c; 1-3c
Orthodontics	Dent. 470	1s-3c; 1s-3c

Approximate Cost of Books and Instruments

**Textbooks*:

First year	$ 80.00
Second year	130.00
Third year	120.00
Fourth year	25.00

**Instruments and Supplies*:

First year	$534.00
Second year	499.00
Third year	383.00
Fourth year	213.00

*Approximate figures.

Students should budget for additional supplies which they are required to purchase from time to time.

Students are not compelled to purchase books or instruments from sources indicated, but they must comply as to quality, and in the case of books—latest editions.

(6) DETAILS OF COURSES

Regular attendance is expected of students in all courses.

Note: The hours of instruction for both terms of the winter session are shown at the top of each course description. The letter "c" attached to a figure signifies clinic-hours and the letter "s" seminar-hours. Otherwise, the first figure in each term indicates lecture-hours and the second laboratory-hours.

ANATOMY

Anatomy 412. General Anatomy and Neuroanotomy (3-4; 3-4)

Anatomy Staff

Gross anatomy of the body in general and of the head and neck in detail; the structure of the human nervous system.

Textbooks: *Manual of Dissection*; Lockhart, Hamilton, Fyfe, *Anatomy of the Human Body*.

Anatomy 416. Microscopic Anatomy—Anatomy Staff (3-4; 3-4)

The minute anatomy and development of the tissues and organs of the human body with special attention to the teeth and related oral structures.

Textbook: Ham and Leeson, or Bloom, *Histology*.

Anatomy 421. Anatomy (Anthropology)—R. F. Shaner (0-0; 1-0)

A brief survey of ancient man, and of the anatomical evidence for man's place in nature.

Prerequisite: Anatomy 11 or 12.

BACTERIOLOGY

Bacteriology 422. Bacteriology (3-3; 1-3)

R. V. Blackmore and Members of the Department of Bacteriology

For students in the second year in Dentistry. During the first term the course deals with general bacteriology illustrating the fundamental aspects

of infection and resistance. In the second term the special bacteriology of the mouth is considered in relation to dental caries and periodontal disease. Exercises in bacteriological technique are given in laboratory periods.

Textbook: Burnett and Scherp, *Oral Microbiology and Infectious Disease.*

BIOCHEMISTRY

Biochemistry 412. General Course—J. Tuba (3-3; 3-3)

The lectures and laboratories are designed to give students in first-year dentistry an appreciation of general biochemical concepts in relation to oral metabolism. In addition to studies of metabolic progress in tissue cells, and their contribution to healthy oral structures, consideration is given to metabolism in dental disease states.

Textbook: Cantarow and Schepartz, *Biochemistry,* or White, Handler, Smith and Stetten, *Principles of Biochemistry.*

COMMUNITY DENTAL HEALTH

Dentistry 411. Orientation, History and Ethics (1-0; 0-0)

C. W. B. McPhail and Associates

This course introduces the student to the profession of dentistry in relation to curriculum content, undergraduate requirements, history of the profession, and the development of ethical concepts and their application. Selected references.

Dentistry 414. Dental Public Health and Community Dentistry (0-0; 1-0)

C. W. B. McPhail and Associates

This course introduces the concept of community dental health with major emphasis on the role of dentistry in public health services. It includes a brief introduction to the historical and philosophical background of public health and the development, growth and current status of principles, legislation and practices related to dental public health.

Selected references.

Dentistry 441. Preventive and Community Dentistry (1-0; 1-0)

C. W. B. McPhail and Associates

This course expands the concepts of community dental health with major emphasis on the role of dentistry in private practice and in the community. It stresses a comprehensive approach to the dental health problem including the following aspects: biometrics as applied in dentistry, prevention and control of dental diseases, auxiliary personnel and recent legislation.

Selected references.

DENTAL PROSTHESIS

Dentistry 419. Dental Materials—C. G. Duke and Associates (1-0; 1-0)

A course of lectures on the various materials used in dental practice. The purpose of this course is to familiarize the student with the properties of all accepted materials.

Textbooks: Skinner, *Science of Dental Materials;* Dorland, *Medical Dictionary.*

Dentistry 420. Full Denture Prosthesis (2-6; 1-3)
A. D. Fee and R. C. McClelland
A course of lectures, demonstrations and laboratory procedures in the construction of artificial full dentures. The lectures relate the material learned in Anatomy 412, Anatomy 416 and Physiology 451 to the principles of full denture construction.

Dentistry 421. Removable Partial Denture Prosthesis (1-3; 0-0)
R. C. McClelland and Associates
Lectures and laboratory instruction in the design and construction of removable partial dentures. Detailed instruction is given as to the conditions where this type of restoration is indicated. The various materials used are studied as to their properties, manipulation and indication.
Textbook: Applegate, *Removable Partial Dentures.*

Dentistry 440. Full Denture Prosthesis—A. D. Fee and Associates (1-6c; 1-6c)
A continuation of Dentistry 420 with an introduction to clinical practice.

Dentistry 460. Denture Prosthesis—A. D. Fee and Associates (1-6c; 1-6c)
A continuation of Dentistry 440 and Dentistry 421 conforming to the advanced work of the final year, with application to clinical practice.

ENDODONTICS

Dentistry 444. Endodontics—D. M. Collinson and Associates (1-2; 0-1c)
A lecture, laboratory and clinical course on the conservation of pulp-involved and pulpless teeth. Procedures for diagnosis and treatment are described, demonstrated and correlated with the related dental and basic sciences. Laboratory practice is carried out on manikins under simulated clinical conditions. The second term consists of an introduction to clinical procedures with treatment carried out on selected patients.
Textbook: Sommer, Ostrander and Crowley, *Clinical Endodontics,* 2nd Ed.

Dentistry 464. Endodontics—D. M. Collinson and Associates (0-1c; 0-1c)
A continuation of Dentistry 444 with application to clinical practice. Endodontic treatment is carried out on selected patients.
Textbook: Sommer, Ostrander and Crowley, *Clinical Endodontics,* 2nd Ed.

ETHICS AND JURISPRUDENCE

Dentistry 451. Ethics and Jurisprudence (1-0; 0-0)
C. W. B. McPhail and Associates
This course deals with the moral and legal aspects of the practice of dentistry. The legal factors are presented and discussed by members of the Faculty of Law.

MEDICINE

Medicine 434. Medicine—D. R. Wilson and Associates (1-0; 0-0)
The general aspects of medicine are dealt with, with particular reference to local and systemic diseases of dental interest.

For students in third-year dentistry.
Textbook: Comroe, Collins and Crane, *Internal Medicine in Dental Practice.*

Medicine 443. General Anaesthesia (Dent. Thera.)—F. Haley (0-0; 1-0)
This is a course for dental students, with particular reference to general anaesthesia. It will comprise, besides lectures and instruction on the general technique of giving various anaesthetics, a course designed to give the student a working knowledge of the preliminary and after-care of patients and of conditions unfavorable for general anaesthesia.

ORAL DIAGNOSIS

Dentistry 426. Oral Diagnosis and Treatment Planning (1-0; 1-0)
D. G. MacGregor and Associates
Diagnostic procedures and their application. The review of normal oral tissues, growth, age changes. The fundamental and elementary principles of dental roentgenology.
Textbooks: McColl and Wald, *Oral Roentgenology;* Thomas Robinson, *Oral and Dental Diagnosis,* 5th Ed.
Reference: Ennis and Berry, *Dental Roentgenology.*

Dentistry 446. Oral Diagnosis and Pathology (1-0; 1-0)
D. G. MacGregor and K. A. McMurchy
Special problems in diagnosis, pathology and treatment planning of less common oral lesions and abnormalities.
Textbooks: Burket, *Oral Medicine, Diagnosis and Treatment;* Stafne, *Oral Roentgenographic Diagnosis.*

Dentistry 466. Pathology Diagnosis Seminar (1s-3c; 1s-3c)
D. G. MacGregor and K. A. McMurchy
Case presentations by the diagnostic and pathology staff. Each student is required to spend not less than one week in the Diagnostic Clinic.

ORAL SURGERY

Dentistry 428. Local Anaesthesia—R. S. Van Alstine (0-0; 1-0)
Lectures and demonstrations on the administration of local anaesthetics.
Textbook: Archer, *Practical Anaesthesia.*

Dentistry 448. Oral Surgery—R. S. Van Alstine (1-1c; 0-1c)
A course of lectures on the cause and treatment of the various conditions of the mouth requiring surgical care, including removal of teeth.
Textbook: Archer, *Oral Surgery.*

Dentistry 468. Oral Surgery—R. S. Van Alstine and Associates (1-3c; 1-3c)
Clinical instruction and demonstrations of exodontia and minor oral surgical procedures under both local and general anaesthesia. Students assist in and observe oral surgery procedures performed in the University Hospital (and other city hospitals when possible).

PATHOLOGY

Pathology 422. General Pathology—J. W. Macgregor (4-2; 0-0)
A series of lectures in general pathology extending over a period of twenty-two weeks. Laboratory instruction in pathologic histology.
Textbooks and References: As cited by instructor.

Dentistry 424. Oral Pathology—K. A. McMurchy (0-0; 1-2)
A lecture and laboratory course dealing with the pathological study of teeth, their surrounding structures, the mucous membrane, bone and other tissues.
Textbook: Shafer, Hine, Levy, *Oral Pathology,* 1958 Ed.

PEDIATRIC DENTISTRY

Orthodontic Division

Dentistry 430. Orthodontics—R. D. Haryett and Associates (1-0; 0-0)
A course of lectures concerned with the growth and development of the dento-facial complex.
Embryology of the face and jaws is also discussed.
Textbook: Moyers, *Handbook of Orthodontics.*
Reference books will be assigned in class.

Dentistry 450. Orthodontics—R. D. Haryett and Associates (1-2; 1-2)
A course of lectures designed to acquaint the dental student with the etiology, classification, diagnosis, prevention, interception and palliative treatment procedures for malocclusions.
Laboratory instruction is given in impression, model and soldering techniques and the construction of appliances designed for cases requiring simple treatment.
Textbook: Same as for Dent. 430.

Dentistry 470. Orthodontics—R. D. Haryett and Associates (1s-3c; 1s-3c)
This course consists of seminars, clinical demonstrations, and clinical training. Each student presents two seminars. In the one, the student presents an essay on an assigned clinical topic; in the other, the student presents an example of an actual clinical problem which is discussed under the headings of diagnosis, etiology, treatment and prognosis.
Clinical demonstrations are given on selected clinical problems such as band placement, occlusal adjustment in the primary dentition, etc.
Clinical training involves preventive, interceptive, and simple treatment of orthodontic problems of particular concern to the general practitioner. The clinical training is designed to enable the student to apply knowledge acquired in the lectures and laboratory.

Pedodontic Division

Dentistry 425. Pedodontics—C. R. Castaldi and Associates (1-0; 0-0)
Mental and physical growth and development of the pre-school child.
Textbook: Gesell, *First Five Years of Life.*

Dentistry 445. Pedodontics—C. R. Castaldi and Associates (1-2; 1-3c)
Physical growth and development in the 6-16 year age group. Restorative and preventive procedures in pre-school and school age children.
Textbook: McDonald, *Pedodontics.*
References: Cohen, *Pediatric Dentistry;* Finn, *Clinical Pedodontics.*

Dentistry 465. Pedodontics—C. R. Castaldi and Associates (1s-3c; 1s-3c)
Case analysis and treatment planning; pedodontics in a general practice, dental care for handicapped children, including restorative treatment under general anaesthesia in a hospital.

Textbook: McDonald, *Pedodontics.*
References: Cohen, *Pediatric Dentistry;* Finn, *Clinical Pedodontics.*

PERIODONTICS

Dentistry 427. Oral Hygiene and Prophylaxis—R. B. Cameron (1-0; 0-0)
A course of instruction in elementary principles and oral hygiene and prophylaxis with introduction to clinic procedure.
Textbooks: Bunting, *Oral Hygiene and Preventive Dentistry;* Muhler, *Preventive Dentistry.*

Dentistry 447. Periodontics—H. L. Samuels and R. B. Cameron (1-2;-0-0)
A course which introduces the student to clinical periodontics, including periodontal examination and charting procedures, and basic instrumentation procedures for the management of periodontal disease. This course includes 10 lectures on nutrition in dentistry.
Textbook: Glickman, *Clinical Periodontology.*

Dentistry 467. Periodontics—H. L. Samuels and R. B. Cameron (1-3c; 1-3c)
Lectures, demonstrations and clinical instruction in the diagnosis and treatment of periodontal disease. The student is afforded an opportunity to manage more advanced cases of periodontal disease. This course also includes case presentations by the student.
One hour first term; demonstrations on patients.
One hour second term; seminar.
Textbook: Same as for Dentistry 447.

Dentistry 449. Dental Therapeutics—R. B. Cameron (0-0; 1-0)
A course of lectures on the various remedies used in treatment of diseases of the mouth.
Textbooks: Prinz, Rickert and Dobbs, *Pharmacology and Dental Therapeutics;* American Dental Association, *Accepted Dental Remedies.*

PHARMACOLOGY

Pharmacology 470. Pharmacology (Second Year) (2-3; 0-0)
E. E. Daniel, G. S. Marks, W. A. Mahon,, D. P. MacLeod, C. W. Nash, J. D. Taylor and Staff
A course on the pharmacological actions of drugs selected for their physiological and clinical significance. The course involves a study of basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs studied include general and local anaesthetics; hypnotics, sedatives and anticonvulsants; analgesics; central nervous system stimulants; autonomic and curariform drugs; histamine and antihistaminics; chemotherapeutic agents. Instruction is given in the form of lectures, demonstrations, laboratory exercises. Written and oral reports, based on laboratory work, are required of each student.
Textbooks: Goth, *Medical Pharmacology;* Goodman and Gilman, *The Pharmacological Basis of Therapeutics,* 2nd Edition.

PHYSIOLOGY

Physiology 451. Physiology (First Year) (4-3; 4-0)

E. O. Höhn, K. M. Chapman, J. W. Pearce and Staff

The course consists of two parts. The first, largely given in the first term, comprises a study of basic physiology of cells and tissues, of the circulatory, digestive and respiratory systems, and of the phenomena of digestion, absorption, metabolism and excretion. The second part comprises the physiology of nerves and synapses, muscle, spinal reflexes, brain centres and tracts, the autonomic nervous system and also includes endocrinology and reproduction.

The course content is presented in lectures, demonstrations, and laboratory exercises.

The lecture course is largely given simultaneously with that of Physiology 411 for medical students: the laboratory classes are given separately.

Texbooks: Bell, Davidson and Scarborough, *Textbook of Physiology and Biochemistry,* 5th ed.; Houssay, *Human Physiology,* 2nd ed.; Guyton, *Textbook of Medical Physiology,* 2nd ed.; Winton and Bayliss, *Human Physiology,* 3rd ed.

Reference Texts: O'Rourke, *Oral Physiology;* Anderson, *Physiology for Dental Students;* Ruch and Fulton, *Medical Physiology and Biophysics,* 18th ed.

PRACTICE MANAGEMENT

Dentistry 452. Practice Management—S. G. Geldart and Associates (0-0; 1-0)

This course deals with accounting procedures, budgeting, insurance, investments, and office procedures and administration based on the effective integration of auxiliary services.

Textbook: Stinaff, *Dental Practice and Administration.*

PSYCHIATRY

Psychiatry 420. Psychodynamics and Dentistry (0-0; 1-0)

K. A. Yonge and Staff

This course deals with essentials of psychodynamics as relevant to the practice of dentistry. It includes discussion of the development of sensation and perception, the significance and effect of anxiety, normal personality types and their extremes, and methods applicable to the dentist for dealing with patients psychotherapeutically.

RESTORATIVE DENTISTRY

Dentistry 413. Oral Anatomy and Introduction to Restorative Dentistry—G. B. Davidson (2-6; 1-3)

A course dealing with the nomenclature, morphology and chronology of the development of the teeth; the internal and external anatomy of the teeth and their occlusion, with clinical application. Time is spent in the latter half preparing cavities in stone, and natural teeth and dentoform, preparatory to Dentistry 423.

Textbooks: Wheeler, *Dental Anatomy and Physiology;* Black, *Operative Dentistry,* Vol II, 9th Edition—Blackwell.

Dentistry 423. Operative Dentistry—G. H. Gibb and Associates (1-6; 1-3)
This course is designed to acquaint the student with the principles and procedures necessary to successful clinical practice. Technical procedures in this course include preparing cavities in artificial and natural teeth and placing restorations of gold foil, gold inlays and amalgam in the prepared cavity. Manikins are used, rubber dams placed and orderly procedure is mandatory. Where timetabling does not interfere the more advanced students will spend some time in the clinic. The student is responsible for supplying suitable natural teeth.

Dentistry 443. Operative Dentistry (1-6c; 1-8c)
The lecture course is a continuation of Dent. 423 meant to emphasize the application of basic principles to clinical practice. The horizon of operative technics is broadened by relating it to the dystrophies, abrasions and erosion. The lecture course is supplemented by a weekly demonstration period.
Clinically the student is introduced to operating in the infirmary. Work is done on patients in gold foil, gold inlay and amalgam.
Cleanliness, deportment and orderliness of procedure are emphasized.
Textbook: Simon, *Clinical Operative Dentistry.*

Dentistry 463. Operative Dentistry (1s-7c; 1s-8c)
Weekly demonstrations supplemented by student clinics, calling for the preparation of papers, slides and models, in phases of the subject not covered in the regular course, serve to broaden the field preparatory to graduation. Clinically the work is a continuation of Dent 443, including an introduction to the use of porcelain, silicates and cements.

Dentistry 422. Fixed Partial Denture (0-0; 1-3)
D. R. Stewart and Associates
Lectures, demonstrations and laboratory instruction on the basic principles in the construction of and in the preparation of abutment teeth for the reception of retainers, piers, pontics and connectors for a fixed partial denture. Manikins are used on which a simple bridge is constructed.

Dentistry 442. Fixed Partial Denture (1-6; 0-3c)
D. R. Stewart and Associates
A continuation of 422 lectures and laboratory exercises during the first half. Lectures include handling of the various materials used and engineering principles involved in fixed partial denture construction. Instruction is also given in the fabrication of a porcelain jacket crown.
The second half is devoted to the clinical application of these principles.

Dentistry 462. Fixed Partial Denture (1-4; 0-5)
D. R. Stewart and Associates
A continuation of Dentistry 442 lectures and clinical experience.

SURGERY

Surgery 434. Surgery—R. A. Macbeth and Associates (0-0; 1-0)
For students in the third year in Dentistry. A course of lectures covering the general principles of surgery.

CLINICAL DENTISTRY

Students of the two final years are required to carry to completion a specified amount of treatment on patients in the various branches of dentistry.

Third-year students are assigned to the diagnostic clinic for specified periods in rotation.

Final-year students are assigned to the diagnostic clinic on full time for periods of a week in rotation. The schedule will appear on the bulletin board.

Final-year students receive instruction at the University Hospital in general anaesthesia, medicine, surgery and restorative dentistry.

XII

The Faculty of Education

INTRODUCTION

The Faculty of Education is organized for the professional education of teachers for elementary, junior high and senior high school grades, and for graduate study and research in the field of Education.

In this calendar appear the courses of study administered by the Faculty of Education together with regulations governing these programs. General regulations applicable to all faculties of the University are to be found in Part I of the Calendar.

The calendar also contains requirements for certificates issued by the Provincial Department of Education on the recommendation of the Faculty of Education. Such certificates are granted under the authority of the Minister of Education.

Address inquiries to: Dean, Faculty of Education, University of Alberta.

(1) Board of Teacher Education and Certification

A Board of Teacher Education and Certification representing jointly the Department of Education, the University of Alberta, the Alberta Teachers' Association and the Alberta School Trustees' Association serves as a liaison body for the groups it represents. This board is purely an advisory body. It is authorized to make recommendations to the Minister of Education and to the President of the University respecting the programs of instruction, the estimates of expenditures on these programs, appointments to the staff of the Faculty of Education, and regulations governing the certification of teachers.

(2) Programs (General Statement)

Entrance or matriculation requirements are specified on the next page.

The programs are described under Details of Programs. There are two general programs, one for elementary school teaching and one for secondary school teaching. Both provide for considerable specialization either in the usual academic subjects or in certain special subjects.

In addition there are highly specialized programs for teachers of industrial arts and vocational education.

All programs provide for certification by the Alberta Department of Education on the completion of two years of teacher education, higher certification at the end of three years, and the Bachelor of Education degree at the end of four years.

To suitable candidates the faculty offers graduate courses leading to the M.Ed., Ed.D. and Ph.D. degrees.

(3) Programs at Edmonton and Calgary

The University of Alberta has two Faculties of Education, one in Edmonton, and the other in Calgary. Each Faculty of Education has its own programs, the outlines of which are set forth in its Calendar. Students who are considering attendance in Calgary should request a Calendar from the Registrar, University of Alberta, Calgary.

ADMISSION

(1) Matriculation Requirements

Matriculants from the high schools of Alberta seeking admission to the Faculty of Education in September, 1964 must possess:

(a) a High School Graduation Diploma with

(b) "B" (50%) or higher standing in each of the courses of Grade XII as set forth below, and

(c) an average in these courses of at least 60%;

1. English 30,
2. Social Studies 30,
3, 4, 5, 6. Four of: French 30, German 30, Latin 30, Chemistry 30, Physics 30, Biology 30 (or 32), Mathematics 30, Mathematics 31, Music 30.

NOTES:

1. Candidates intending to major in biological sciences or household economics should present Chemistry 30 or equivalent.
2. Candidates intending to major in physical sciences should present Chemistry 30, Physics 30, and Mathematics 30 or equivalents.
3. Candidates intending to major in mathematics should present Mathematics 31 in addition to Mathematics 30.
4. Mathematics 31 to be accepted when presented after June, 1962, on the basis of a Grade XII Departmental examination.
5. Adult applicants (age 20 or over) will not be required to present a high school diploma, but (b) and (c) above still apply.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

(2) Admission with Advanced Standing or Advanced Credits

Applicants presenting transcripts from normal schools, teachers' colleges, or universities other than the University of Alberta, will have such transcripts evaluated by the *Committee on Admissions*. The transcripts should be submitted to the Dean of the Faculty of Education, University of Alberta, Edmonton. A *VISE* fee of *FIVE* dollars is charged for evaluating documents issued in Canada and *TEN* dollars for evaluating documents issued in other countries.

(3) Extramural Credits

(a) Credit to a maximum of four *junior* courses taken extramurally from another recognized university will be allowed, although the actual number will vary with the program.

(b) Students who expect to receive credit on their University of Alberta program in the Faculty of Education for subjects studied extramurally from other

institutions must get permission in writing from the Dean's Office to take a particular subject for credit.

(4) Application for Admission

Application forms may be obtained from the office of the Dean of the Faculty of Education or from the Registrar of the University. Each student applying for the first time for admission to the Faculty of Education should write the Examinations Branch, Department of Education, Edmonton, requesting that a transcript of his high school record be forwarded to the Registrar of the University at Edmonton or Calgary. When writing for a transcript he should give his name in full, the year in which his last departmental examinations were written and the grade level of these examinations. He should enclose the fee of $2.00 charged for this service.

Students from outside the province will write to the Registrar of the Provincial Department of Education in the province where senior matriculation was obtained.

Credits obtained in the June examinations of 1964 should be submitted as soon as results are available.

No definite and final ruling concerning registration can be obtained until all certificates and transcripts of standing have been reviewed by the Committee on Admissions. The Faculty of Education gladly consults with and advises students regarding programs of study, but all decisions are *unofficial* and *tentative* until documents have been received and evaluated by the Committee on Admissions.

REGISTRATION

(1) Registration and Pre-Registration Procedures

Applicants for admission must—

(a) furnish evidence by means of a transcript of credit record from a Department of Education or other educational authority that they meet matriculation requirements;

(b) complete, in duplicate, *Application for Admission* forms obtainable from the Registrar;

(c) indicate whether they expect to attend in Edmonton or Calgary.

(2) Registration Details

(a) Change of Registration;

The accuracy of his registration forms is the responsibility of each student. Changes in registration may be allowed on application to the Faculty of Education office on or before October 7.

(b) Transfer from One Program to Another:

In general, a student may transfer from one training program to another at any point in the four-year program, provided he obtains credit in subjects of the new program which were not included in the former one.

(c) Registration in Physical Education:

General University regulations require all first-year students to obtain credit in physical education. **Though students excused by a medical officer need not participate in physical exercise, they are held responsible for all theoretical and instructional phases of the courses.**

GENERAL INFORMATION

(1) Education Undergraduate Society

The Education Undergraduate Society (E.U.S.) is a professional organization and a branch of the Alberta Teachers' Association (A.T.A.). It is expected that all Education students will:

(a) join the Society,
(b) participate in its social activities, and
(c) actively promote its professional interests.

(2) Transfer from One Program to Another

In general, a student may transfer from one training program to another at any point in the four-year program, provided he obtains credit in subjects of the program which were not included in the former one.

(3) Examinations

Finals

Final examinations are held at the end of each winter, summer or special session. The pass mark in all subjects of both degree and certification programs is 50%.

Supplementals

(a) There is no supplemental privilege in student teaching.
(b) Teachers who, during the regular Supplemental Examination period, are in teaching positions may, with approval, write the supplemental examination at the end of the Summer Session. If an examination in the required subject is on the regular schedule, the fee for the supplemental is $10.00. If a special examination paper must be prepared, the fee is $15.00.
(c) Students who *fail* courses in the Summer Session will not be granted supplementals.

(4) Extramural Study

For conditions under which undergraduates may receive credit for extramural study, see ADMISSION (3).

The privilege of completing certain courses extramurally is sometimes extended to M.Ed. candidates and also to B.Ed. candidates who hold a B.A., B.Sc., or B.Com. degree. No courses in Education are offered extramurally.

Some departments in the Faculty of Arts and Science may consent to extramural registration in certain courses.

(5) Regulations Governing Certification

For detailed regulations governing certification of teachers, students should write the Registrar, Department of Education, Administration Building, Edmonton. A pamphlet is available on request.

(6) Advance Credits for Certificated Teachers

One year's credit in the four-year program is given for one year of basic teacher education.

(7) A student whose B.Ed. program has been inactive for three years or who has failed to complete the degree in fifteen years may have his program reviewed and, if necessary, rearranged.

A maximum of three course credits will be allowed in the four-year general B.Ed. program for courses completed in Department of Education summer school sessions, 1935-43 inclusive, one course credit being allowed for every 75 hours of certified attendance. For teachers discharged from the armed forces a date earlier than 1935 will be taken to make full allowance for the applicant's period of service.

Allowance for credit from Department of Education Summer Sessions is to be withdrawn effective September 1, 1965.

Few advance credits can be given certificated teachers in the B.Ed. in Industrial Arts program. One or two credits may be allowed for normal school or other basic training. Little credit can be given for courses completed in the 1935-43 summer sessions unless the courses are in the specialized field of the B.Ed. program for which they are being evaluated.

Allowance for credit from Department of Education Summer Sessions is to be withdrawn effective September 1, 1965.

(8) **Special Second-Year Program for Certificated Teachers**

Certificated teachers will for their second year be entered upon a special program consisting almost exclusively of Arts and Science courses. See DETAILS OF PROGRAMS—C.

(9) **Evening Credit Program**

Students contemplating registration in Evening Credit courses must register on or before August 31, the last day for registration in the Evening Credit Program.

CERTIFICATION

Alberta teaching certificates are issued only by the Department of Education, Government of Alberta. All inquiries concerning certification should be addressed to the Registrar, Department of Education, Edmonton.

The certificates mentioned in the following pages are authorized under Order-in-Council 728 (1954) of the Government of Alberta.

A. (General Certificates)

Types of Certificates

1. Except as otherwise provided herein, the certificates issued hereafter by the Minister of Education shall be of the following classes:

Junior E Certificate,
Standard E Certificate,
Standard S Certificate,
Professional Certificate.

Limitation on Permanent Certificates

No person other than a British subject or Canadian citizen is eligible to receive a permanent Alberta teacher's certificate.

Statement of Age and Citizenship

"Statement of Age and Citizenship" forms must be completed by each applicant for an Alberta teacher's certificate.

Grade Ranges of Certificates

2. The range of school grades throughout which each of the teachers' certificates mentioned above is a valid license to teach is shown in the following schedule:

Certificates	*Grades*
Junior E	I-IX
Standard E	I-IX
Standard S	IV-XI
Professional	I-XII

The Junior E Certificate

3. (a) Teachers prepared in Alberta or under other jurisdictions prior to September 1, 1962, may be issued Interim Junior E Certificates, provided their academic and professional qualifications are acceptable to the Minister.

(b) Before the Interim Junior E Certificate may be made permanent, the holder:

(i) must provide evidence to the Department of Education through the Faculty of Education that he possesses matriculation standing that will admit him to a Bachelor of Education program,

(ii) must teach successfully in Alberta schools for two years, and

(iii) must be recommended by a Superintendent or Inspector of Schools.

The Standard E Certificate

4. (a) A person who has completed satisfactorily the first two years of the B.Ed. program of the University of Alberta prescribed for teachers of elementary and junior high school grades may be granted an Interim Standard E Certificate.

(b) Before the Interim Standard E Certificate may be made permanent, the holder:

(i) must teach successfully in Alberta schools for two years, and

(ii) must be recommended by a Superintendent or Inspector of Schools.

The Standard S Certificate

5. (a) A person who has completed satisfactorily the first two years of the B.Ed. program of the University of Alberta prescribed for teachers of the high school grades may be granted an Interim Standard S Certificate.

(b) The interim Standard S Certificate may be made permanent as in 4(b) above.

(c) Graduates from the Junior E program, or from a regular Normal School one-year program, will enter a six-course program for the second year of the elementary route, or a seven-course program for the second year of the secondary route. (See DETAILS OF PROGRAMS.)

The Professional Certificate

6. (a) A person who has completed satisfactorily three years of the B.Ed. program of the University of Alberta prescribed for teachers of the elementary and junior high school grades or of the high school grades may be granted an Interim Professional Certificate.

(b) The Interim Professional Certificate may be made permanent as in 4 (b) above.

The Certification of University Graduates

7. (a) The holder of a bachelor's degree, an Honors bachelor's degree or a Master's degree acceptable to the Minister may be granted an Interim Professional Certificate upon completion of one year's approved work in the Faculty of Education.

(b) Such Interim Certificates may be made permanent as in 4 (b) above.

Teachers with Permanent Certification

8. The requirements for a permanent certificate may be waived in the case of a teacher qualifying for any certificate, provided he previously held an Alberta permanent certificate of another class.

B. (Existing Certificates)

Exchange of Certificates

9. The holder of a certificate or license issued under former regulations may, upon application to the Minister, exchange it for a new certificate as indicated in the following table:

Table of Certificate Ratings

Certificates named in O.C. No. 70-50 or in former Regulations	*Equivalent Certificates*
Temporary License	Interim Junior E
Junior Elementary and Intermediate School Certificate	Interim Junior E
Second-Class Certificate (see section 10 below)	Junior E
Elementary and Intermediate School Certificate	Junior E (with teaching privileges extended to include Gr. X)
Senior Elementary and Intermediate School Certificate	Standard E
Junior Certificate for the High School	Standard S
First-Class Certificate	Standard E and Standard S (with teaching privileges extended to include Gr. XII)
High School Certificate	Professional
Academic Certificate	Professional
First-Class Certificate with Bachelor's degree	Professional

Second-Class Certificate

10. The holder of a permanent Second-Class Certificate may be granted a Junior E Certificate upon the completion of B.Ed. matriculation or one approved summer session of work taken either before or after the coming into effect of these regulations and if recommended by a Superintendent or Inspector of Schools. The holder of a Second-Class Certificate, either interim or permanent, shall be entitled to teach grades one to nine inclusive.

DETAILS OF PROGRAMS

INTRODUCTION

In this section the course requirements of the following programs are described:

A. B.Ed. Program—Elementary Route
B. B.Ed. Program—Secondary Route
C. Special Transfer Program for Certificated Teachers
D. B.Ed. Programs in Industrial Arts
E. B.Ed. Program in Vocational Education
F. B.Ed. Program for Holders of Approved Degrees
G. Advanced Study in Education

Junior Elementary Certificate

1. Before a person who holds the Interim Junior Elementary Certificate may proceed to a Bachelor of Education program he must provide evidence to the Dean of the Faculty of Education that he has met matriculation standing; see ADMISSION.
2. Persons with deficiencies in the Junior Elementary program will be permitted to clear these deficiencies by completing satisfactorily appropriate subjects approved by the Dean of the Faculty of Education.

BASIC GRADUATION REQUIREMENTS (Applicable to A, B, C, D, and E below)

1. To be granted the B.Ed. degree, a student must obtain a passing mark or better in each course and obtain an average of 60% in all courses credited toward the degree. (Those who transfer to the B.Ed. program, University of Alberta, with advanced standing will be required to maintain a 60% average on all courses completed at the University of Alberta toward the B.Ed. degree.)
2. A student will not be allowed to write more than *five* supplemental examinations for the purpose of obtaining passing marks or raising the average to the required 60%.
3. A student will not be allowed to write more than *two* supplemental examinations in any year.
4. A student who is repeating a year will be granted no supplemental privileges in the courses taken that year and must pass all courses with a 60% average to be allowed to continue.
5. The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in the Faculty of Education.
6. The privilege of repeating a failed course will not be granted more than once.
7. The maximum number of additional courses, including repeated courses, in which a student may enrol for completion of a B.Ed. degree program may not exceed by more than *five* the number of courses required for completion of the particular B.Ed. degree program.

Students admitted prior to January 2, 1963, will be allowed to graduate, provided they do so before June 30, 1966, by taking advantage of these graduation requirements or of those set forth in item 1, page 50 of the 1962-63 Calendar of the Faculty of Education.

A. Standard Elementary B.Ed. Route

Upon completion of the first two years, candidates are eligible for the Interim Standard E Certificate, valid in Grades I to IX; upon completion of three yeras, the Interim Professional Certificate valid in Grades I to XII; and upon completion of four years, the B.Ed. degree.

Elementary Route Program

First Year

1. Ed. Fdn. 201 and Ed. Adm. 261
2. Ed. Psy. 276
3. English 200 or 210
4. Major

*5. Approved Arts or Science option

6. Physical Education 218 (men) or 228 (women)

Second Year

(For Special Transfer Second Year, Elementary Route, see C below.)

1. Ed. CI 205 and Ed. CI 231
2. Ed. CI 209 and Ed. CI 213
3. Ed. CI 221 and Ed. CI 237
4. P.E. 337 and Ed. CI 227
5. Ed. CI 200

*6. Major *or* Approved Arts or Science option

Elementary Route students in the *Second Year* do not continue classes in subjects listed under 1, 2, 3, 4, during student teaching.

Third Year

1. Ed. Psy. 476
2. Philosophy 240 or 242
3. Approved Social Science or History option

*4. Approved Arts or Science *or* Education option

5. Major

Fourth Year

1. Ed. Fdn. 492
2. Arts or Science option
3. Senior Arts or Science option
4. Senior Education option
5. Major

General Notes:

Graduation Requirements:

(a) Basic requirements: as outlined in DETAILS OF PROGRAMS—Introduction.

(b) *Special requirements:
An approved Arts or Science option must be selected from each of *two* fields, chosen from the following six: art, drama, mathematics, music, physical education, and science. (Exclusive of *major* field)

Elementary Route Major Fields

Candidates must select a major field of study. Courses are to be chosen according to the patterns listed below.

I. Art
1. Art 200
2. Art 230
3. Art 240
4. Ed. CI 310

II. English
1. English 288
2. English 398
3. Approved Senior English or Linguistics
4. Ed. CI 322 or 338

III. Early Childhood Education
1. An approved fine arts
2. English 398
3. Physical Education 200 or Drama 360
4. Ed. CI 320 or 324

IV. French
1. French 201
2. French 330
3. Approved Senior French
4. Ed. CI 336

V. Mathematics
1. Mathematics 274
2. Mathematics 201 or 207 or 180
3. Mathematics 374
4. Ed. CI 328

VI. Music
1. Music 200
2. Music 300
3. Music 250 or 400
4. Ed. CI 314

VII. Physical Education
1. Physical Education 202
2. Physical Education 325 and 327
3. Physical Education 419 and 421
4. Physical Education 431 and one of P.E. 427 or 433

VIII. Science
1. } Biology 130, Biology 230 or Chemistry 230 or Chemistry 250 or Physics
2. } 200.*

*Students selecting a biological science in the first year must select a physical science in the second year, and vice versa.

3. Astronomy 253 or Geography 201 or Geology 201
4. Ed. CI 332

IX. Social Studies
1. A basic course in any social science or history
2. Geography 201 or History 210 or Sociology 202 or an approved senior social science or history*
3. Approved senior social science or history*
4. Ed. CI 306

*A course sequent to one taken in a previous year.

Use of Options

Students should give careful consideration to the various opportunities provided by the Arts or Science option, the Education option, and the Senior Arts or Science or Education option in the Elementary Route program. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the elementary school.

The following are illustrative of the ways in which these courses may be patterned:

1. Education of exceptional children in the elementary school
   (a) Ed.Psy 354
   (b) One of Ed.Psy 450, 452, 454, 456, or 458
   (c) One of Genetics 351, Physiology 360, Sociology 320 or 370

   OR

   Two of Psychology 336, 341, 353, 365, 366, 383, 431, 475, or 489.
2. *Further study in the major field*
   Two Arts or Science courses in major field
   One supporting Education option
3. *Elementary School Libraries*
   Ed. CI 346
   English 398
   One supporting Arts or Education option

Other patterns will be available in early childhood education, speech, reading, second language instruction, etc.

Students are urged to plan the patterning of these courses in consultation with the Dean or the departmental head.

B. Standard Secondary B.Ed. Route

Upon completion of the first two years, candidates are eligible for the Interim Standard S. Certificate, valid in Grades IV to XI; upon completion of three years, the Interim Professional Certificate, valid in Grades I to XII; and upon completion of four years, the B.Ed. degree.

Secondary Route Program

First Year

1. Ed. Fdn. 201 and Ed. Adm. 261
2. Ed. Psy 276
3. English 200* or 210

*English majors must elect English 200.

4. Major
5. Approved Arts or Science Option
6. Physical Education 218 (men) or 228 (women)

Second Year

(For special transfer second year, secondary route, see C below.)

1. Approved Social Science or History
2. Curriculum and Instruction (Major Field)
3. Ed. CI 250
4. Major
5. Major or Arts or Science option

Third Year

1. Ed. Psy 476
2. Phil. 240, or Phil 242
3. Senior Education option
4. Major
5. Major or Arts or Science option

Fourth Year

1. Ed. Fdn. 492
2. Senior Education Option
3. Major
4. Major or Arts or Science option
5. Major or Arts or Science option

General Notes

1. At least three courses in the major field must be completed by the end of the second year.
2. Basic graduation requirements: See DETAILS OF PROGRAMS—INTRODUCTION.

Secondary Route Major Fields

Each candidate must select a major field of study. Courses are to be chosen according to the patterns listed below.

Major Field	*Prescribed Core*	*Supporting Courses*
I. English	1. English 288 2. English 395 3. ⎫ Two of English 332, 356, 4. ⎭ 364, 373, 380, 383, 388, 392, 393, or 396 5. Any senior English course not selected in 3 or 4 above *or* Drama 360	6. ⎫ Any two senior 7. ⎭ English courses *or* Two approved courses in history, foreign language, the fine arts or classics

Major Field	*Prescribed Core*	*Supporting Courses*
II. French	1. French 201 2. French 330 3. French 350 4. One of French 360, 370, 375, 380, or 399 5. French 400	6. } Any one of the courses 7. } listed under 4 and a senior Arts option *or* Two approved courses in history, English, or other languages
III. German	1. German 200 2. German 330 3. German 350 4. } Two senior 5. } German courses	6. } Any senior German course 7. } and a senior Arts option *or* Two approved courses in history, English, or other languages
IV. Latin	1. Latin 200 2. Latin 300 3. Latin 373 4. Latin 374 5. Latin 375	6. Classics 350 *or* 351 7. Roman history 353 *or* a senior Latin course *or* Two approved courses in history, English, or other languages
V. Other Foreign Languages	1. } 2. } 3. } Any five 4. } approved 5. } courses	6. } Two approved courses in 7. } history, English or other languages
VI. Social Studies	1. History 201 2. History 370 3. Geography 201 4. Geography 300	5. } 6. } Three approved social 7. } science courses or history one of which must be in a field other than history or geography
VII. Mathematics	1. Mathematics 274 2. Mathematics 201 or 207 or 180 3. Mahtematics 374 4. Approved senior mathematics 5. Statistics 255	6. } Two senior mathematics 7. } courses *or* two approved courses in a related field.

Major Field	*Prescribed Core*	*Supporting Courses*
VIII. Biological Sciences	1. Biology 130 2. Biology 230 3. Approved Senior Zoology 4. }Chemistry 230 5. }Chemistry 350 *or* Chemistry 250 Approved senior Zoology or Botany	6. An approved senior Botany course 7. An approved senior course in Biology or Biochemistry or related science
	*Students who enter this program with credit in Biology 30 (or equivalent) are not required to take Biology 130. Instead, they will move directly to the second course on the major pattern and take an *approved Botany course* to complete the prescribed core.	
IX. Physical Sciences*	1. Chemistry 230 2. Mathematics 207 or 201 3. Physics 200 or 240 4. Chemistry 350 5. An approved senior Physics course	6. An approved senior physics *or* chemistry course 7. An approved course in mathematics *or* An approved course in a physical science
	*Careful attention should be given to the mathematics prerequisites or corequisites for physics courses.	
X. Fine Arts Art	1. Art 200 2. Art 230 3. Art 240 4. Art 250 5. One of Art 300, 330, 400 or Philosophy 350	6. }Two approved options in 7. }a related field
Music	1. Music 200 2. Music 300 3. Music 400 (or 250 with approval) 4. }Any two of Music 250, 5. }400, 311, 350, or 450 *or* Philosophy 350	6. }Any two of the courses 7. }listed under 4 and 5 *or* Two approved options in a related field
Drama	1. Drama 250 2. Drama 350 3. One of Drama 300, 360, or 400 4. Drama 480 5. Philosophy 350 or a senior course in Drama	6. }Any two courses listed 7. }under 3, 4, and 5 *or* Two approved options in a related field

Major Field	*Prescribed Core*	*Supporting Courses*
XI. Household Economics	1. Household Economics 202 2. Household Economics 210 3. Household Economics 460 4. Household Economics 453 and 303 (half courses) 5. Household Economics 350	6. Chemistry 250 or 350 7. House Ec. 464 *or* Two approved options in a related field
XII. Business Education		
(a) Secretarial	1. Ed. Bus. 346 *or* 246 and 345 2. Ed. Bus. 348 *or* 248 and 347 3. Accounting 200 4. Ed. Bus. 350 5. Business Law 310	6. } Two approved options 7. } in a related field
(b) Accounting-Clerical	1. Ed. Bus. 346 or 246 and 345 2. Accounting 200 3. Ed. Bus. 350 4. Business 202 or 300 or approved alternative 5. Business Law 310	6. } Two approved options 7. } in a related field

NOTE: Normally, students will present 1. and 2. on one of the above patterns as prerequisites to Ed.CI 282. However, for the 1964-65 term *only*, students who have selected 246 or 248 may with the approval of the instructor, carry 345 or 347 as corequisite to Ed.CI 282.

Beginning in September, 1965, all students will be required to present evidence of competence in typewriting before being admitted to the Business Education program.

NOTE: Appropriate equivalent courses to be substituted in Calgary.

Use of Options

Students should give careful consideration to the various opportunities provided by the two Arts/Science Options and the two Education Options in the Secondary B.Ed. program. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the Secondary School.

The following are illustrative of the ways in which these courses may be patterned:

1. *Guidance in the Secondary School*

Two of Ed. Psy. 308, 310, or 478
and
Two of Soc. 360, Soc. 370, Psych. 353 and Psych. 383
or
Statistics 255 and two of Soc. 341, Soc. 343 or Psych. 336

2. *Further Specialization in Teaching Field*
   - Two Arts or Science courses in the major field
   - One advanced Curriculum and Instruction course
   - One supporting Education option

3. Physical Education in the Secondary School
   - Physical Education 232 and 332
   - Ed.CI 498
   - A related Education option

4. *Teaching in the Junior High School*
   - Two Arts or Science options (selected to give breadth)
   - Two Education options

Other patterns will be available in library services, speech, special education, etc.

Students are urged to plan the patterning of these courses in consultation with the Dean or the departmental head.

C. Special Transfer Second Year for Certificated Teachers

Certificated teachers are granted credit for the first year of the general B.Ed. program for their Normal School or Junior E training, provided that this training was of not less than seven months' duration.

If such certificated teachers have clear matriculation into the Faculty of Education, they will be admitted to the second year of the program. A special program for the second year is provided in order that all essential courses will be included.

It will be noted that candidates taking the Elementary Route have six courses to do; those entering the Secondary Route have seven. The reason for this extra load is that all one-year training was in the field of elementary education.

Students take five courses in a winter session. A summer session is required to complete the *transfer* second year.

Note: Students entering the Secondary Route must present credit in at least one course in the major field as prerequisite to the second and third courses in the major field and as prerequisite to Curriculum and Instruction course in the transfer year. Hence the summer session will normally be taken prior to the transfer year.

Second Year

Elementary Route

1. English 200 or 210
2. Major
3. Major
4. Arts or Science option
5. Arts or Science option
6. Sr. Education option

Secondary Route

1. Major
2. Major
3. Approved Social Science or History
4. English 200 or 210
5. Curriculum and Instruction (major field)
6. Major
7. Major or Arts or Science option

*Some observation and student teaching may be required of students registered in these courses.

Third and Fourth Years

As prescribed for these years in the regular programs for the B.Ed. degree—Elementary or Secondary Route.

Special Programs

In all special programs, students may qualify for the Interim Standard S Certificate, valid in Grades IV to XI, at the end of the second year.

D. B.Ed. in Industrial Arts

August 4 is the last day for receiving applications for admission to the first year of the B.Ed. in Industrial Arts Program.

Basic Bachelor of Education in Industrial Arts Program—Edmonton

First Year

1. Ed. IA 203 and Ed. Adm. 261
2. Ed. Psy 276
3. English 210
4. Mathematics 207 or 201
5. Ed. IA 260
6. Physical Education 218 (Men), 228 (Women)

Second Year

1. Chemistry 230
2. Ed. CI 250
3. Physics 240
4. Sociology 202
5. Ed. IA 270

Certification: Interim Standard S Certificate

Third Year

1. Ed. Psy 476
2. Philosophy 240 or 242
3. Physics 340
4. Ed. IA 360
5. Ed. IA 370

Certification: Interim Professional Certificate

Fourth Year

1. Ed. Fdn 492
2. Sociology 390
3. Ed. IA 350
4. Ed. IA 460
5. Ed. IA 470

General Note

1. Basic Graduation Requirements: See DETAILS OF PROGRAMS—INTRODUCTION
2. Transfers may be arranged from former IA Programs to the above.

Basic General Program (Calgary Only)

No further First Year registrations accepted on this program.

Second Year

1. English 240.
2. Ed. Adm 261: Educational Administration.
3. Ed. IA 280: Education Methods (Grade VII to XII).
4. Ed. CI 300: Observation and Student Teaching.
5. Ed. IA 341: Mechanical Drawing.
6. Ed. IA 244: Electricity.
7. Ed. IA 342: Woodwork.

   Certification: Interim Standard S Certificate.

Third Year

1. Philosophy 240 or 242: General History of Thought.
2. A junior or senior A, B, C, option.
3. A senior A, B, C option.
4. Ed. IA 248: Auto Mechanics.
5. Ed. IA 441: Woodwork.
6. Ed. IA 246: Metalwork.

   Certification: Interim Professional Certificate.

Fourth Year

1. Ed. Fdn 492: Philosophy of Education.
2. Ed. Psy 476: Educational Psychology.
3. A senior A, B, C option.
4. Ed. IA 347: Auto Mechanics.
5. Ed. IA 344: Electricity.
6. Ed. IA 349: Handicraft.
7. Ed. IA 345: Welding.

General Note

1. Basic Graduation Requirements: See DETAILS OF PROGRAMS—INTRODUCTION

E. B.Ed. in Vocational Education

Admission: Matriculation as defined for the general B.Ed. program.

First Year

1. Trade training as verified by a recognized Certificate of Qualification as a Journeyman for a designated trade or equivalent for a non-designated trade. The trade qualification is to be approved by an admissions sub-committee comprised of the Dean of the Faculty of Education, the Head of the Department of Industrial and Vocational Education, the University Admissions Secretary, the Chairman of the Provincial Apprenticeship Board, the Supervisor of Vocational Education of the Department of Education.
2. Experience in a trade or industry calling for the trade training held by the candidate, this also to be verified by the admissions sub-committee.

Second Year

1. Ed. Fdn 201
2. Ed. Adm 261
3. Ed. Voc 204

4. Ed. Psy 276
5. English 210
6. Ed. Voc 280
7. Ed. CI 250

Certification: Interim Standard S. Certificate

Third Year

1. Ed. Psy 476
2. Philosophy 240 or 242
3. Ed. Voc 350
4. Junior Arts/Science
5. Junior Arts/Science

Certification: Interim Professional Certificate

Fourth Year

1. Ed. Fdn 492
2. Ed. Voc option
3. Senior Arts/Science option
4. Senior Arts/Science option
5. Senior Arts/Science option

Notes:

1. One Arts or Science sequence to be directly related to vocational education.
2. One Arts or Science sequence to provide an element of general education.
3. Basic Graduation Requirements: See DETAILS OF PROGRAMS—INTRODUCTION.

F. B.Ed. Programs for Holders of Approved Degrees

All holders of approved degrees who expect teacher certification will meet at 9:00 a.m. on Monday, September 21, 1964, in Room 129, Education Building, to begin a four-day orientation and observation program in the schools.

(1) Program for Teachers in the Secondary School

(1) Ed. Adm 461: Educational Administration (2-0; 2-0)
(2) Ed. Psy 476: Educational Psychology (3-0; 3-0)
(3) Ed. CI 450: Observation and Student Teaching
(4) Ed. Fdn 492: Philosophy of Education (3-0; 3-0)
(5) Education: Curriculum and Instruction (major field) (3-0; 3-0)
(6) Ed. Fdn 414: Educational Sociology (3-0;3-0) or
Ed. Psy 478: Measurement and Evaluation (3-0; 3-0)
(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate.)
(7-11) Five approved courses, at least two of which must be in Education and at least two of which must be in Arts or Science.
(Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree).

GENERAL NOTES:

I. Students who present a degree which does not contain the equivalent of a major as required in the regular secondary route B.Ed. will be required to

make up such deficiencies before proceeding with this program. A maximum of two such courses may be credited toward the degree.

II. Students will be required to present a basic course in psychology as a prerequisite for Ed. Psy. 476.

III. Students will be required to present a basic course in philosophy as a prerequisite for Ed. Fdn. 492.

IV. Holders of approved degrees who do not possess credit in the prerequisites for Ed. Psy. 476 or Ed. Fdn. 492 or both will be permitted to register in a six-course program leading to the Standard S Certificate.

V. Holders of Approved Degrees who lack psychology or philosophy prerequisites may complete the B.Ed. degree with eleven courses; the program is the same length as for the students who present philosophy and psychology courses as part of their approved degrees.

The program will take one of the following forms:

1. Ed. Adm. 461
2. Ed. CI (major field)
3. Ed. CI 450
4. Ed. Fdn. 414 or Ed. Psy. 478

Lacking Ed. Fdn. 492 prerequisite	Lacking Ed. Psy. 476 prerequisite	Lacking both Ed. Psy. 476 and Ed. Fdn. 492 prerequisites
5. Ed. Psy. 476	5. Ed. Psy. 276	5. Ed. Psy. 276
6. Phil 240 or 242	6. Ed. Fdn. 492	6. Phil. 240 or 242
At this point the Standard S Certificate will be recommended.		
7. Ed. Fdn. 492	7. Ed. Psy. 476	7. Ed. Psy. 476
		8. Ed. Fdn. 492
At this point the Professional Certificate will be recommended.		
8. Sr. Ed. opt.	8. Sr. Ed. opt.	9. Sr. Ed. opt.
9. Sr. Ed. opt.	9. Arts/Sc./Ed. opt.	10. Sr.Arts/Sc. opt.
10. Sr. Arts/Sc. or Ed. opt.	10. Sr. Arts/Sc. opt.	Sr. Ed. opt.
11. Sr. Arts/Sc. opt.	11. Sr. Arts/Sc. opt.	11. Sr. Arts/Sc. opt.

VI. Graduation Requirements:

1. To be recommended for the B.Ed. degree a student on this program must obtain a passing mark or better in each course and obtain a 60 per cent average in all courses credited toward the degree. (Those who transfer to the B.Ed. program, University of Alberta, with advanced standing will be required to maintain a 60 per cent average on all courses completed at the University of Alberta toward the B.Ed. degree.)
2. Holders of the B.Com. Degree, wishing to enter the Business Education program, must present evidence of competence in typewriting. Students who are deficient in this respect should plan to remove the deficiency through attendance at Summer Session.)
3. A student on this program will not be allowed to write more than *two* supplemental examinations for the purpose of obtaining passing marks or raising his average to the required 60 per cent.

4. A student will not be allowed to write more than *two* supplemental examinations in any year.

5. Students admitted prior to Jan. 2, 1963, will be allowed to graduate, provided they do so before June 30, 1965, by taking advantage of these graduation requirements or of those set forth in items 5 or 6 in the Calendar of the Faculty of Education for 1962-63.

VII. Provision is made for the planning of the options to provide for further specialization in subject fields, guidance and counselling, library services, and the like.

VIII. *Certificated Candidates* (Jr. E or equivalent) will present Ed. Psy 476, Ed. Fdn. 492 and CI major field for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 11 (inclusive) of the program.

IX. Students interested in qualifying for a Master's degree or Graduate Diploma rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements for graduate study.

X. The holders of an approved Honors or Masters degree may qualify for the B.Ed. degree by completing the first eight of the required courses and meeting the graduation requirements.

(2) Program For Teachers in the Elementary School

(1) Ed. Adm 461: Educational Administration (2-0; 2-0)
(2) Ed. Psy 476: Educational Psychology (3-0; 3-0)
(3) Ed. CI 400 (Ed. 482): Observation and Student Teaching
(4) Ed. Fdn 492: Philosophy of Education (3-0; 3-0)
(5) Ed. CI 402: Curriculum and Instruction in the Elementary School, I (3-3; 3-3)
(6) Ed. CI 404: Curriculum and Instruction in the Elementary School, II (3-1; 3-1)
(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate.)

(7-11) Five approved courses, at least two of which must be in Education and at least two of which must be in Arts or Science.
(Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree).

General Notes:

I. Students who present a degree which does not contain the equivalent of a major as required in the regular elementary route B.Ed. will be required to make up such deficiencies before proceeding with this program. A maximum of two such courses may be credited toward the degrees.

II. Students will be required to present a basic course in psychology as a prerequisite for Ed. Psy 476.

III. Students will be required to present a basic course in philosophy as a prerequisite for Ed. Fdn. 492.

IV. Holders of approved degrees who do not possess credit in the prerequisites for Ed. Psy 476 or Ed. Fdn 492 or both will be permitted to register in a six-course program leading to the Standard E Certificate.

V. Holders of Approved Degrees who lack psychology or philosophy prerequisites may complete the B.Ed. degree with eleven courses; the program is the same length as for the students who present philosophy and psychology courses as part of their approved degrees.

The program will take one of the following forms:

1. Ed. Adm. 461
2. Ed. CI 402
3. Ed. CI 404
4. Ed. CI 400

Lacking Ed. Fdn. 492 prerequisite	Lacking Ed. Psy. 476 prerequisite	Lacking both prerequisites
5. Ed. Psy. 476	5. Ed. Psy. 276	5. Ed. Psy. 276
6. Phil. 240 or 242	6. Ed. Fdn. 492	6. Phil. 240 or 242
At this point the Standard E Certificate will be recommended.		
7. Ed. Fdn. 492	7. Ed. Psy. 476	7. Ed. Psy. 476
		8. Ed. Fdn. 492
At this point the Professional Certificate will be recommended.		
8. Sr. Ed. opt.	8. Sr. Ed. opt.	9. Sr. Ed. opt.
9. Sr. Ed. opt.	9. Sr. Arts/Sc./Ed. opt.	10. Sr. Arts/Sc./Ed. opt.
10. Sr. Arts/Sc./Ed. opt.	10. Sr. Arts/Sc. opt.	11. Sr. Arts/Sc. opt.
11. Sr. Arts/Sc. opt.	11. Sr. Arts/Sc. opt.	

VI. Graduation Requirements

1. To be recommended for the B.Ed. degree a student on this program must obtain a passing mark or better in each course and obtain a 60 per cent average in all courses credited toward the degree. (Those who transfer to the B.Ed. program, University of Alberta, with advanced standing will be required to maintain a 60 per cent average on all courses completed at the University of Alberta toward the B.Ed. degree.)
2. A student on this program will not be allowed to write more than *two* supplemental examinations for the purpose of obtaining passing marks or raising his average to the required 60 per cent.
3. A student will not be allowed to write more than *two* supplemental examinations in any year.
4. Students admitted prior to Jan. 2, 1963 will be allowed to graduate, provided they do so before June 30, 1965, by taking advantage of these graduation requirements or of those set forth in items 5 or 6 in the Calendar of the Faculty of Education for 1962-63.

VII. Provision is made for the planning of the options to provide for specialization in subject fields, primary education, reading, education of exceptional children, and the like.

VIII. *Certificated Candidates* (Jr. E. or equivalent) will present Ed. Psy 476 and Ed. Fdn 492 for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 11 (inclusive) of the program.

IX. Students interested in qualifying for a Master's degree or Graduate Diploma rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements for graduate study.

X. The holder of an approved Honors or Masters degree may qualify for the B.Ed. degree by completing the first eight of the required courses and meeting graduation requirements.

(3) Program for Vocational Education Teachers

An eleven-course program leading to a B.Ed. in Vocational Education for holders of approved degrees (e.g. B.Sc. in Engineering, B.Comm., B.Sc. in Home Ec.) as follows:

(1) Ed. Adm 461
(2) Ed. Psy 476
(3) Ed. Voc 480
(4) Ed. CI 450
(5) Ed. Fdn 492
(6) Ed. Voc 404

(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate.)

(7-11) Five approved courses, at least two of which must be in Education and at least two of which must be in Arts or Science.

(Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree).

General Notes:

I. Candidates must hold a Journeyman's Certificate or have had preparation and experience recognized by the University as equivalent.

II. Students will be required to present a basic course in psychology as a prerequisite for Ed. Psy 476.

III. Students will be required to present a basic course in philosophy as a prerequisite for Ed. Fdn. 492.

IV. Holders of approved degrees who do not possess credit in the prerequisites for Ed. Psy 476 or Ed. Fdn. 492 or both will be permitted to register in a six-course program leading to the Standard S Certificate.

V. Holders of Approved Degrees who lack psychology or philosophy prerequisites may complete the B.Ed. degree with eleven courses; the program is the same length as for the students who present philosophy and psychology courses as part of their approved degrees.

The program will take one of the following forms:

1. Ed. Adm. 461
2. Ed. Voc. 480
3. Ed. CI 450
4. Ed. Voc. 404

Lacking Ed. Fdn. 492 prerequisite	Lacking Ed. Psy. 476 prerequisite	Lacking both Ed. Psy. 476 and Ed. Fdn. 492 prerequisites
5. Ed. Psy. 476	5. Ed. Psy. 276	5. Ed. Psy. 276
6. Phil. 240 or 242	6. Ed. Fdn. 492	6. Phil. 240 or 242
At this point the Standard S Certificate will be recommended.		
7. Ed. Fdn. 492	7. Ed. Psy. 476	7. Ed. Psy. 476 8. Ed. Fdn. 492
At this point the Professional Certificate will be recommended.		
8. Sr. Ed. opt.	8. Sr. Ed. opt.	9. Sr. Ed. opt.
9. Sr. Ed. opt	9. Sr. Arts/Sc./Ed. opt.	10. Sr. Arts/Sc./ Ed. opt.
10. Sr. Arts/Sc./Ed. opt.	10. Sr. Arts/Sc. opt.	
11. Sr. Arts/Sc. opt.	11. Sr. Arts/Sc. opt.	11. Sr. Arts/Sc. opt.

VI. Graduation Requirements:

1. To be recommended for the B.Ed. degree a student on this program must obtain a passing mark or better in each course and obtain a 60 per cent average in all courses credited toward the degree. (Those who transfer to the B.Ed. program, University of Alberta, with advanced standing will be required to maintain a 60 per cent average on all courses completed at the University of Alberta toward the B.Ed. degree.)
2. A student on this program will not be allowed to write more than *two* supplemental examinations for the purpose of obtaining passing marks or raising his average to the required 60 per cent.
3. A student will not be allowed to write more than *two* supplemental examinations in any year.
4. Students admitted prior to Jan. 2, 1963, will be allowed to graduate, provided they do so before June 30, 1965, by taking advantage of these graduation requirements or of those set forth in items 5 or 6 in the Calendar of the Faculty of Education for 1962-63.

VII. Provision is made for the planning of the options to provide for further specialization in subject fields, guidance and counselling, library services, and the like.

VIII. *Certificated Candidates* (Jr. E. or equivalent) will present Ed. Psy 476, Ed. Fdn 492 and Ed. Voc. 480 and Ed Voc 404 for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 11 (inclusive) of the program.

IX. Students interested in qualifying for a Master's degree or Graduate Diploma rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements for graduate study.

X. The holders of an approved Honors or Masters degree may qualify for the B.Ed. degree by completing the first eight of the required courses and meeting the graduation requirements.

G. ADVANCED STUDY IN EDUCATION

(1) Graduate Diploma Programs in Education

The Faculty of Education sponsors a series of diploma programs providing additional special qualification in designated areas. Admission to the Graduate Diploma Program will be granted to holders of an approved degree and a Professional (in some Departments the Permanent Professional) Teaching Certificate or its equivalent. Normally, courses taken prior to the 1963 Summer Session may not be credited toward the Diploma unless the student is currently a candidate for the M.Ed. degree. Students who now hold the M.Ed. degree may not obtain the Diploma on the basis of course marks obtained on the M.Ed. degree program. Courses credited toward the diploma may not also be credited toward the B.Ed. degree. The pass mark for courses to be credited toward the Diploma is 65%. Residence requirements for the Diploma may be met in consecutive summer sessions or in a winter session.

Diploma programs are offered by all Departments of the Faculty. Enquiries should be directed to the office of the Department concerned.

(2) Graduate Degrees in Education

All candidates for advanced degrees register with the Faculty of Graduate Studies which administers graduate programs throughout the University.

In the Faculty of Education graduate work is offered for the preparation of teachers, supervisors, guidance workers, administrators and other educational specialists, and may lead to the degrees of Master of Education, Doctor of Education and Doctor of Philosophy. Candidates for these advanced degrees specialize in terms of the departmental organization of the Faculty of Education as follows:

Department of Elementary Education: curriculum and instruction in kindergarten, primary and elementary education (Grades I - VI). Head—Dr. W. H. Worth.

Department of Secondary Education: curriculum and instruction in secondary education. (Grades VII - XII). Head—Dr. L. W. Downey.

Department of Educational Foundations: philosophy, sociology, and history of education. Head—Dr. B. E. Walker.

Department of Educational Psychology: child and adolescent psychology, educational psychology, guidance, mental hygiene, special education, clinical psychology, tests and measurements. Head—Dr. G. M. Dunlop.

Department of Educational Administration: school administration (elementary and secondary), general supervision, school finance and business administration, chief administrative roles. Head—Dr. A. W. Reeves.

Department of Industrial and Vocational Education: Industrial Arts and Vocational Education. Head—Dr. H. R. Ziel.

In order to meet the needs and interests of candidates, the departments permit considerable flexibility in the programs leading to advanced degrees. In general, students pattern their courses from the offerings of the department of their choice supplemented by approved courses from other departments of the University. Normally a candidate for the master's degree must present a program consisting of six courses and a minor thesis. A candidate for the master's degree is required to spend at least one academic year in study and research in residence at the University of Alberta. A candidate for the doctor's degree (if he already holds a master's degree) is normally required to spend two academic years in study and research in residence at the University of Alberta.

Graduate courses in education are offered in both the regular and the summer sessions.

Initial Procedure: Students who wish to inquire about graduate programs should address all preliminary inquiries to the Dean of the Faculty of Graduate Studies, University of Alberta, Edmonton.

After a student has decided upon an area of specialization, he should communicate directly with the appropriate department head and, if possible, arrange for an interview. By this means the student's eligibility will be determined and further information given about the degree programs available in the Department.

(3) Special Students

A student holding a B.Ed. degree or the equivalent and not desiring to register for a graduate degree or not meeting all the requirements for admission to the Faculty of Graduate Studies, may register in the Faculty of Education as a *special* student.

DETAILS OF COURSES

NOTE: The hours of instruction per week for both terms are shown at the top of each course description. The first figure in each term indicates lecture hours and the second laboratory hours. Courses which may be taught in either term are indicated by the words "half-year". Even numbered courses are full courses; odd numbered courses are half courses.

STAFF OF THE FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL ADMINISTRATION—

Professors—J. H. M. Andrews, G. L. Mowat, A. W. Reeves (Head), H. T. Sparby
Associate Professors—F. Enns, W. D. Knill, H. C. Melsness
Assistant Professor—W. N. Toombs

DEPARTMENT OF EDUCATIONAL FOUNDATIONS—

Professor—B. E. Walker (Head)
Associate Professors—B. Y. Card, S. A. Earl, G. R. Eastwood, M. R. Lupul, K. H. Thomson, L. F. Troutner
Assistant Professors—R. E. Eick

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY—

Professors—C. C. Anderson, D. B. Black, G. M. Dunlop (Head), J. W. Gilles, R. S. MacArthur
Associate Professors—J. D. Ayers, D. R. Cameron, C. M. Christensen, W. D. Dannenmaier, W. B. Dockrell, M. Gulutzan, R. J. C. Harper, S. Hunka, F. T. Kelly, J. Macdonald
Assistant Professors—L. E. Pass, H. W. Zingle

DEPARTMENT OF ELEMENTARY EDUCATION—

Professor—W. H. Worth (Chairman)
Associate Professors—Muriel A. Affleck, R. D. Armstrong, Helen M. Diemert, M. D. Jenkinson, Dorothy M. Lampard, E. R. Moore, L. D. Nelson, N. M. Purvis, W. F. Reese
Assistant Professors—Elizabeth Filipkowski, E. L. Koch, R. L. Ware, L. G. Wiedrick L. L. Wilson

DEPARTMENT OF SECONDARY EDUCATION—

Professors—E. W. Buxton, H. T. Coutte, L. W. Downey (Head)

Associate Professors—G. L. Berry, Geraldine Farmer, J. A. Forbes, J. O. Fritz, L. Ruth Godwin, C. G. Hampson, M. Nay, W. Pilkington, A .A. Smith

Assistant Professors—W. F. Coulson, Madeleine J. Monod, J. O. Regan, S. E. Sigurdson

DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION—

Professor—H. R. Ziel (Chairman)

Assistant Professors—J. E. Gallagher, T. R. Jensen

I—CURRICULUM AND INSTRUCTION (Ed. CI)

Elmentary Education

A. Undergraduate Courses

Ed. CI 200. Student Teaching in the Elementary School (100 hrs.)

Ed. CI 205. Curriculum and Instruction in Elementary School Social Studies (3L; 0-0)or(0-0; 3L)or(1 1/2L; 1 1/2L)

Ed. CI 209. Curriculum and Instruction in Elementary School Art (3L; 0-0)or(0-0; 3L)or(1 1/2L; 1 1/2L)

Ed. CI 213. Curriculum and Instruction in Elementary School Music (3L; 0-0)or(0-0; 3L)or(1 1/2L; 1 1/2L)

Ed. CI 221. Curriculum and Instruction in Elementary School Reading (3L; 0-0)or(0-0; 3L)

Ed. CI 227. Curriculum and Instruction in Elementary School Mathematics (3L; 0-0)or(0-0; 3L)

Ed. CI 231. Curriculum and Instruction in Elementary School Science (3L; 0-0)or(0-0; 3L)or(1 1/2L; 1 1/2L)

Ed. CI 237. Curriculum and Instruction in Elementary School Language (3L; 0-0)or(0-0; 3L)

Ed. CI 306. Social Studies in Elementary Education (3-0; 3-0)
Prerequisite: Ed. CI 205 or equivalent, and at least one course on the major pattern.

Ed. CI 310. Art in the Elementary School (3-0; 3-0)
Prerequisites: Ed. CI 209 or equivalent, and at least one course on the major pattern.

Ed. CI 314. Music in the Elementary School (3-0; 3-0)
Prerequisites: Ed. CI 213 or Ed. CI 292 or consent of department.

Ed. CI 320. Reading at the Primary Level (3-0; 3-0)
Prerequisites: Ed. CI 221 or equivalent, and at least one course on the major pattern.

Ed. CI 322. Reading at the Upper Elementary and Secondary Levels (3-0; 3-0)
Prerequisites: Ed. CI 221 or equivalent, and at least one course on the major pattern.

Ed. CI 324. Expressional Activities for the Primary Grades (3-0; 3-0)
Prerequisites: A teaching certificate and at least one course on the major pattern.

Ed. CI 326. Curriculum and Instruction in the Kindergarten (3-0; 3-0)
Prerequisite: A teaching certificate.

Ed. CI 328. Mathematics in the Elementary School (3-0; 3-0)
Prerequisites: Ed. CI 227 or equivalent, and at least one course on the major pattern.

Ed. CI 332. Science in Elementary Education (3-0; 3-0)
Prerequisites: Ed. CI 231 or equivalent, and at least one course on the major pattern.

Ed. CI 336. French in the Elementary School (3-0; 3-0)
Prerequisites: A teaching certificate and at least one course on the major pattern.

Ed. CI 338. Language in Elementary Education (3-0; 3-0)
Prerequisites: Ed. CI 237 or equivalent, and at least one course on the major pattern.

Ed. CI 342. Speech in the Elementary School (3-0; 3-0)
Prerequisite: A teaching certificate

Ed. CI 346. School Libraries (3-0; 3-0)
Prerequisite: A teaching certificate

Ed. CI 400. Student Teaching in the Elementary School (100 hrs.)

Ed. CI 402. Curriculum and Instruction in the Elementary School I (3-3; 3-3)

Ed. CI 404. Curriculum and Instruction in the Elementary School II (3-1; 3-1)

Ed. CI 424. Diagnostic and Remedial Program (0-3; 0-3)

Ed. CI 438. Teaching English as a Second Language (3-0; 3-0)

B. Graduate Courses

Ed. CI 500. Elementary Education Seminar
Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures. The seminar will be offered as arranged. No course credit will be given.

Ed. CI 518. Physiology and Psychology of Reading (3-0; 3-0)
Prerequisite: Ed. CI 320 or Ed. CI 322 or consent of department.

Ed. CI 520. Clinical Study of Remedial Reading (3-3; 3-3)
Prerequisite: Ed. CI 518 and consent of department

Ed. CI 522. Organization and Supervision of the Reading Program (3-0; 3-0)
Prerequisite: Ed. CI 320 or Ed. CI 322 or consent of department.

Ed. CI 528. Program Development in Elementary School Mathematics (3-0; 3-0)
Prerequisite: Ed. CI 328 or Ed. CI 472, or consent of department.

Ed. CI 538. Program Development in Elementary School Language (3-0; 3-0)
Prerequisite: Ed. CI 338 or consent of department.

Note: **Registration in courses numbered 600 and above is restricted to graduate students; in each course, credit is given according to work done, to a minimum of six hours. Not all are offered every year.**

Ed. CI 602. Elementary Education

Ed. CI 618. Research in Reading

I—CURRICULUM AND INSTRUCTION (Ed. CI)

Secondary Education

A. Undergraduate Courses

Ed. CI 250. Student Teaching in the Secondary School

Ed. CI 254. Curriculum and Instruction in Secondary School English (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 258. Curriculum and Instruction in Secondary School Foreign Language (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 266. Curriculum and Instruction in Secondary School Social Studies (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 270. Curriculum and Instruction in Secondary School Mathematics (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 274. Curriculum and Instruction in Secondary School Biological Sciences (3L; 3L)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 278. Curriculum and Instruction in Secondary School Physical Sciences (3L; 3L)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 282. Curriculum and Instruction in Secondary School Business Education (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 286. Curriculum and Instruction in Secondary School Household Economics (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 290. Curriculum and Instruction in Secondary School Art (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 292. Curriculum and Instruction in Secondary School Music (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 294. Curriculum and Instruction in Secondary School Drama (3-0; 3-0)
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 352. Speech in the Secondary School (3L; 3L)

Ed. CI 362. Audio-Visual Education (3L; 3L)

Ed. CI 450. Student Teaching in the Secondary School (100 hrs.)

Ed. CI 454. Curriculum and Instruction in Secondary School English (3-0; 3-0)
Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 456. Advanced Curriculum and Instruction in Secondary School English (3-0; 3-0)
Prerequisites: Two courses in English, and Ed. CI 254 or 454 or consent of department.

Ed. CI 458. Curriculum and Instruction in Secondary School Foreign Languages (3-0; 3-0)
Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 460. Advanced Curriculum and Instruction in Secondary School Foreign Languages (3-0; 3-0)
Prerequisite: An Ed. CI course and two courses in a foreign language, and Ed. CI 258 or 458 or consent of department.

Ed. CI 466. Curriculum and Instruction in Secondary School Social Studies (3-0; 3-0)
Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 468. Advanced Curriculum and Instruction in Secondary School Social Sciences (3-0; 3-0)
Prerequisites: Two courses in social sciences, and Ed. CI 266 or 466 or consent of department.

Ed. CI 470. Curriculum and Instruction in Secondary School Mathematics (3-0; 3-0)
Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 472. Advanced Curriculum and Instruction in Secondary School Mathematics (3-0; 3-0)
Prerequisites: Two courses in mathematics, and Ed. CI 270 or 470 or consent of department.

Ed. CI 474. Curriculum and Instruction in Secondary School Biological Sciences (3L; 3L)

Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 476. Advanced Curriculum and Instruction in Secondary School Biological Sciences (3L; 3L)

Prerequisites: Two courses in biological sciences, and Ed. CI 274 or 474 or consent of department.

Ed. CI 478. Curriculum and Instruction in Secondary School Physical Sciences (3L; 3L)

Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 480. Advanced Curriculum and Instruction in Secondary School Physical Sciences (3L; 3L)

Prerequisites: Two courses in physical sciences, and Ed. CI 278 or 478 or consent of department.

Ed. CI 482. Curriculum and Instruction in Secondary School Business Education (3-0; 3-0)

Prerequisites or corequisites: 1. Ed. Bus. 246 or 346; 2. Ed. Bus. 248 or 348 *or* Ed. Bus. 350.

Ed. CI 484. Advanced Curriculum and Instruction in Secondary School Business Education (3-0; 3-0)

Prerequisites: Two business education courses, and Ed. CI 282 or 482, or consent of department.
(Not offered, 1964-65)

Ed. CI 486. Curriculum and Instruction in Secondary School Household Economics (3-0; 3-0)

Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 490. Curriculum and Instruction in Secondary School Art (3-0; 3-0)

Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 492. Curriculum and Instruction in Secondary School Music (3-0; 3-0)

Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 494. Curriculum and Instruction in Secondary School Drama

Prerequisites or corequisites: Five full courses on the major pattern.

Ed. CI 496. Advanced Curriculum and Instruction in the Fine Arts — Music, Art or Drama (6L; 6L)

Prerequisite: Consent of Department.

Ed. CI 498. Curriculum and Instruction in Secondary School Physical Education

Prerequisite: BPE degree or consent of department.

B. Graduate Courses

Ed. CI 550. Secondary Education Seminar
Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of reserach problems and procedures. The seminar will be offered as arranged. No course credit will be given.

Ed. CI 580. Curriculum Development (3-0; 3-0)
Curriculum research, theory and practice with particular reference to curriculum aims, content, organization, and change.

Note: Registration in courses numbered 600 and above is restricted to graduate students; in each course, credit is given according to work done, to a minimum of six hours. Not all are offered every year.

Ed. CI 680. Teaching in the Secondary School
Theory and research in selected subject-matter fields.

II—EDUCATIONAL FOUNDATIONS (Ed. Fdn)

A. Undergraduate Courses

Ed. Fdn 201. Introduction to Education (3-0; 0-0) or (0-0; 3-0)

Ed. Fdn 301. Introduction to Education (3-1; 0-0)
A course designed to give the student a general knowledge of the history of education; the various influences that have shaped and changed educational beliefs and philosophy: political, economic, social and religious; reference to the growth and development of education in Canada and the Province; Alberta School Law as it affects Health Personnel; observation and practical teaching experience.
Open only to students in the Dental Auxiliary program.

Ed. Fdn 414. Sociology of the School (3-0; 3-0)
Study of the school as a social institution in the changing society.

Ed. Fdn 471. Contemporary Systems of Education in Western Europe, the U.S.A. and the U.S.S.R. (3-0; 0-0)

Ed. Fdn 473. Contemporary Systems of Education in Selected Countries of Asia and Africa (0-0; 3-0)

Ed. Fdn 481. History of Canadian Education Before 1867 (3-0; 0-0)

Ed. Fdn 483. History of Canadian Education After 1867 (0-0;3-0)

Ed. Fdn 492. Philosophy of Education (3-0; 3-0)
Prerequisite: Philosophy 240 or 241 or 242. For holders of approved degrees other basic philosophy courses may be accepted by the Department.

B. Graduate Courses

Ed. Fdn 500. Education Seminar
Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures. The seminar will be offered as arranged. No course credit will be given.

Ed. Fdn 514. Sociology of Education (3-0; 3-0)
The analysis of educational institutions using sociological theory and research methods.
Prerequisites: Ed. Fdn 414 or a basic course in sociology or consent of Department.

Ed. Fdn 571. Studies of Educational Change in Western Nations (3-0;0-0)

Ed. Fdn 573. Functions of Education in the Development of Emerging Nations (0-0; 3-0)

Ed. Fdn 581. History of Education in Western Europe Prior to 1900 (3-0; 0-0)

Ed. Fdn 583. History of Education in the United States Prior to 1900 (0-0; 3-0)

Ed. Fdn 592. Philosophy of Education (3-0; 3-0)
Critical analysis of educational issues and theories.
Prerequisite: Ed. Fdn 492 or equivalent.

III—EDUCATIONAL PSYCHOLOGY (Ed. Psy)

A. Undergraduate Courses

Ed. Psy 276. Introduction to Educational Psychology (3-0; 3-0)
An introduction to childhood and adolescence, stressing physical, mental, social, emotional, and personality development; the psychology of learning and of the special learning areas; the application of psychological principles to classroom practice.

Ed. Psy 308 Guidance (3-0; 3-0)
Basic principles and techniques of guidance; case studies, interviews, records, with emphasis on scholastic and personal guidance; introduction to the tests and measures most commonly used in guidance.
Prerequisite: Ed. Psy 276 or equivalent.

Ed. Psy 310. Personal Adjustment in Education (3-0; 3-0)
Dynamics of behavior, emotional and social adjustment of school children; teacher adjustment; social adjustment in the classroom.
Prerequisite: Ed. Psy 276 or equivalent.

Ed. Psy 354. Psychology and Education of Exceptional Children (3-0; 3-0)
A survey of the psychology and education of atypical children for whom special education is provided. Educational needs including curricula, teaching methods and classroom organization will be considered.
Prerequisite: Ed. Psy 276.

Ed. Psy 450. Teaching Speech to the Deaf (3-1; 3-1)
Importance of speech as a medium in the emotional, social and mental development of deaf children; the organs of speech, their function and development; principles and methods used in developing speech; correction of acquired

speech; development of useful and effective speech skills; utilization of residual hearing and other sensory avenues; auditory training and use of hearing aids; observation and laboratory experience.

Ed. Psy 452. Psychology and Education of Mentally Handicapped Children (3-0; 3-0)
The psychology and education of severely mentally retarded and mentally handicapped children with special emphasis on organization, curriculum and methods of teaching.
Prerequisite: Ed. Psy 354 or consent of department.

Ed. Psy 454. Psychology and Education of Gifted Children (3-0; 3-0)
The psychological characteristics of children of superior academic ability; educational provision for superior children including identification, curriculum, teaching methods and classroom organization.
Prerequisite: Ed. Psy 354 or consent of department.

Ed. Psy 456. Psychology and Education of Physically Handicapped Children (3-0; 3-0)
The psychological characteristics of children with orthopaedic and neurological handicaps; appropriate educational provision for them.
Prerequisite: Ed. Psy 354 or consent of department.

Ed. Psy 458. Psychology and Education of Emotionally Disturbed Children (3-0; 3-0)
The psychological characteristics of emotionally disturbed or socially maladjusted children; their education in ordinary and special classrooms.
Prerequisite: Ed. Psy 354 or consent of department.

Ed. Psy 474. Education Clinic (3-3; 3-3)
(See Ed. Psy 574)

Ed. Psy 476. Educational Psychology (3-0; 3-0)
Individual differences; psychology of learning and forgetting; motivation; personality, adjustment, and mental hygiene; introduction to evaluation and the testing program.
Prerequisite: Ed. Psy 276, Psychology 202 or equivalent.

Ed. Psy 478. Measurement and Evaluation (3-0; 3-0)
Measurement of classroom achievement; teacher-made and standardized tests; interpretation and use of test results; evaluation of non-academic achievements; recording and reporting pupil progress.
Prerequisite: Ed. Psy 276 or equivalent.

B. Graduate Courses

Ed. Psy 500. Education Seminar
Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures. The seminar will be offered as arranged. No course credit will be given.

Ed. Psy 502. Introduction to Educational Research (3-1; 3-1)
Quantitative and non-quantitative research, with applications of elementary statistics to the collection and analysis of data.

Ed. Psy 508. Problems in Educational and Vocational Guidance (3-0; 3-0)
Theories of vocational development and choice; group standardized tests and inventories.
Prerequisite or corequisite: Ed. Psy 476.

Ed. Psy 510. Counselling in Education (3-4; 3-4)
Theories and techniques of counselling; supervised laboratory experience; case conference seminar.
Prerequisite or corequisite: Ed. Psy 508 or equivalent.

Ed. Psy 550. Teaching Speech to the Deaf (3-1; 3-1)
(See Ed. Psy 450)

Ed. Psy 552. Psychology and Education of Mentally Handicapped Children (3-0; 3-0)
(See Ed. Psy 452)

Ed. Psy 554. Psychology and Education of Gifted Children (3-0; 3-0)
(See Ed. Psy 454)

Ed. Psy 556. Psychology and Education of Physically Handicapped Children (3-0; 3-0)
(See Ed. Psy 456)

Ed. Psy 558. Psychology and Education of Emotionally Disturbed Children (3-0; 3-0)
(See Ed. Psy 458)

Ed. Psy 570. Child Psychology (3-0; 3-0)
A systematic study of the growth, development, behavior and problems of adjustment of children of pre-school and elementary school ages.
Prerequisite: Ed. Psy 476.

Ed. Psy 572. Psychology of Adolescence (3-0; 3-0)
A systematic study of the growth, development, behavior and problems of adjustment of children of junior and senior high school ages.
Prerequisite: Ed. Psy 476

Ed. Psy 574. Education Clinic (3-3; 3-3)
Training in the measurement of intelligence, achievement, interests, aptitudes and adjustment of school children. Laboratory experience in the Education Clinic in measurement, diagnosis and remedial treatment of school children.
Prerequisite: Ed. Psy 476.

Ed. Psy 576. Statistics and Research Design in Education (3-1; 3-1)
Application of descriptive statistics and statistical inference, at an intermediate level, to problems of research design and measurement in education.
Prerequisite: Statistics 255 or Ed. Psy. 502.

Ed. Psy 578. Theory and Application of Measurement in Education (3-0; 3-0)
Prerequisite: Statistics 255 or Ed. Psy 502.

Ed. Psy 592. Social Psychology of School and Classroom (3-0; 3-0)
Individual behavior as it affects and is affected by the behavior of others; implications of research in leadership and group process for classroom teaching.
Prerequisites: Sociology 341, and *one* of Sociology 343, 344, 345, 346.

Note: Registration in courses numbered 600 and above is restricted to graduate students; in each course, credit is given according to work done, to a minimum of six hours. Not all are offered every year.

Ed. Psy 610. Advanced Theory and Practice of Counselling

Ed. Psy 670. Developmental Psychology

Ed. Psy 674. Problems of Adjustment of School Children

Ed. Psy 676. The Psychology of Learning

Ed. Psy 678. Educational Measurement and Experimental Research

IV—EDUCATIONAL ADMINISTRATION (Ed. Adm)

A. Undergraduate Courses

Ed. Adm 261. Educational Administration: The Role of the Teacher (3-0; 0-0) or (0-0; 3-0)

Ed. Adm 461. Educational Administration: the Role of the Teacher (2-0; 2-0)
For holders of approved degrees.

Ed. Adm 500. Research Seminar
Non-credit: hours to be arranged.

Ed. Adm 525. Administration of Educational Personnel (3-0; 0-0)
The supervisory functions of staffing, consulting, and motivating, including such topics as selection and placement, teacher evaluation, in-service training, individual consultation, leadership, teacher morale, use of authority, and organization for supervision.

Ed. Adm 559. Administration of Public Education in Canada (3-0; 0-0)
The legal basis of structure and control. Organizational and operational features of provincial school systems. Current administrative problems.

Ed. Adm 561. Evolving Concept in Educational Administration (0-0; 3-0)
Administrative behavior in relation to educational purposes, processes and situations.

Ed. Adm 563. Administration of the Educational Program (0-0; 3-0)
Patterns of school organization, curriculum adaptation, staff utilization, pupil personnel practices, program evaluation, and learning materials.

NOTE: Full-year courses corresponding to the above four half-year courses (525, 559, 561 and 563) are designated Ed. Adm. 526, 560, 562 and 564.

Ed. Adm 566. Educational Finance (3-0; 3-0)
Sources of school revenue and analysis of expenditures. Provincial school grants in Canada. The case for federal aid. Plans for equalizing the financial support of public education and major problems involved in their

implementation. Principles and practices in the budgeting of school funds. Financial accounting and reporting. Capital expenditures. Salary schedules. Cost analysis.

Note: **Courses numbered in the 600's are conference courses in which credit is given according to work done, to a maximum of six hours.**

Ed. Adm 626. Educational Supervision

Ed. Adm 660. The Organization and Government of Public Education

Ed. Adm 662. The Problems of Educational Administration and Supervision

Ed. Adm 664. The Administrative Role of Principals and Superintendents

Ed. Adm 666. Educational Finance

V—BUSINESS EDUCATION (Ed. Bus)

Ed. Bus 246. Teaching of Typewriting (6L; 6L)

Typewriting, and the teaching of typewriting in the secondary school. Open to students not eligible for admission to Ed. Bus 346.

Ed. Bus 248. Teaching of Shortand (6L; 6L)

Shorthand, and the teaching of shorthand in the scondary school. Open to students not eligible for admission to Ed. Bus 348.

Ed. Bus 345. Typewriting Practice (0-3;-0-3)

Advanced Typewriting.

Note: Required of candidates who present Ed. Bus 246 for credit on the major in business education.

Ed. Bus 346. Teaching of Typewriting (6L; 6L)

Advanced typewriting, and the teaching of typewriting in the secondary school. Prerequisite: Typewriting 20 of the high school with B standing, or the Junior Certificate in Typewriting.

Note: Students who do not show sufficient competence in typewriting will be required to register in Ed. Bus 246. Not open to students who hold credit in Ed. Bus 246.

Ed. Bus 347. Shorthand Practice (0-3; 0-3)

Advanced Shorthand.

Prerequisites: Ed. Bus 248 and Ed. Bus 246 or 346.

Note: Required of candidates who present Ed. Bus 248 for credit on the major in business education.

Ed. Bus 348. Teaching of Shorthand (6L; 6L)

Advanced shorthand, and the teaching of shorthand in the secondary school. Prerequisites: Typewriting 20 and Shorthand 20 of the high school with B standing, or the Junior Certificates in Shorthand and Typewriting.

Note: Students who do not show sufficient competence in shorthand will be required to register in Ed. Bus 248. Not open to students who hold credit in Ed. Bus 248.

Ed. Bus 350. Office Training (6L; 6L)

Office organization and services with special reference to business communication and filing procedures. Introduction to business machines.

VI—INDUSTRIAL ARTS (Ed. IA)

Ed. IA 203. Introduction to Industrial Arts (3-0; 0-0)

An examination of past and present theory and practice in Industrial Arts Education.

Ed. IA 241-341. Industrial Arts—Mechanical Drawing
(First and Second Years) (1-2; 1-2)

Use and care of drafting instruments and drafting equipment. Single-stroke lettering. Geometric drawing, including angles, polygons, tangents and ellipses, with problems. The making and use of scales. Mechanical and architectural conventions. Conventional drawing of bolts and screws. Simple blueprint reading.

Orthographic projection, including sections and auxiliary views. Cabinet and isometric drawing. Shop sketching. Projection perspective and the plan method of mechanical perspective.

Assembly and detail drawing. Surface development drawing, including shapes based on type forms and triangulation methods. Simple building drawing. Drawing of shop projects involving simple design. Tracing and blueprinting.

Ed. IA 242. Industrial Arts—Woodwork (2-4; 2-4)

Care, adjustment and repair of hand tools. Basic tool procedures involving instruction and practice in the use of all the commonly used hand tools. Wood finishing; application of the elementary types of finishes, paints, stain and varnish, enamel, etc.

Ed. IA 244. Industrial Arts—Electricity (3-3; 3-3)

Electron theory; sources of electrical energy; electrical units; electrical circuits; Ohm's Law; Canadian Electrical Code; electro-magnetic induction, Lenz's Law; electrical instruments; direct current motors and generators.

Ed. IA 246. Industrial Arts—Metal Work (2-4; 2-4)

Common metals and their alloys; elementary metallurgy; sheet metal work; introduction to welding, forging, casting, heat treating; bench work.

Ed. IA 248. Industrial Arts—Automotive Mechanics (2-4; 2-4)

The automobile and its power plant; general construction of the automobile; auxiliary system; fuel, carburetion, lubricating, cooling, clutch and gear box; rear axles; drive shafts and universal joints; front axles and steering gears; brakes; miscellaneous.

Ed. IA 260. General Industrial Arts (3-6; 3-6)

Development of basic knowledge and skill in the following: ceramics, electricity, graphic arts, metals, plastics, wood; organization and management of multiple-activity laboratories.

Note: (This course is designed to prepare industrial arts majors for teaching in grades seven and eight.)

Ed. IA 270. Introduction to Technolagy (3-6; 3-6)

Development of basic knowledge and skills in the following technological areas: computer, electricity-electronics, graphic communications, materials and processes, mechanical, power; organization and management of multiple-activity laboratories.

Note: (This course is designed to prepare industrial arts majors for teaching in grades eight and nine.)

Ed. IA 280. Educational Method for Industrial Arts Students (3-0; 3-0)

Required of all B.Ed. in Industrial Arts candidates qualifying for the Standard S Certificate in winter session. The first half of the course well be devoted to a study of the basic principles of teaching methods as they apply to a variety of subject areas in the high school. The second half of the course will deal with special methods and techniques specific to industrial arts.

Ed. IA 342. Industrial Arts—Woodwork (2-4; 2-4)

Further development of proficiency in using hand tools. Use of woodworking machines of various types. Filing and fitting hand saws. Wood finishing; further development in the application of various types of finishes (stained, shellacked, rubbed and waxed finishes).

Prerequisite: Ed. IA 242.

Ed. IA 344. Industrail Arts—Electricity (2-4; 2-4)

Principles of alternating currents; single-phase induction motors; rectifiers; telephones; electronics; electro-magnetic waves; transformers.

Prerequisite: Ed. IA 244.

Ed. IA 345—Industrial Arts—Welding (1-2; 1-2)

The theory and practice of oxy-acetylene and arc welding.

Ed. IA 346. Industrial Arts—Metal Work (2-4; 2-4)

Non-Ferrous metals and their alloys; metallurgy; machine shop practice; forging, welding, casting and heat treating continued; advanced drill press and bench work.

Ed. IA 347. Industrial Arts—Automotive Mechanics (1-2; 1-2)

Electric circuits of the automobile; battery ignition; generator, starting motor, lighting, horn and accessory circuits; tune-up, trouble diagnosis.

Prerequisite: Ed. IA 248.

Ed. IA 349. Industrial Arts—Handicrafts 3 hrs. (half year)

Procedures, materials and project development in media particularly suitable for the junior high school industrial arts program: leather, plastics, art metal, woodcraft novelties, wood carving.

Ed. IA 350. Educational Programs and Practices in Industry and Labor (3-0; 3-0)

Scope, organization, practice and evaluation, of educational programs conducted by management and labor.

Ed. IA 360. Laboratory of Technology (2-4; 2-4)

Laboratory experiences to acquaint industrial arts majors with interrelationships of technologies and the influence of organization and workers upon quality and cost of product.

Ed. IA 370. Technology I (2-4; 2-4)

Development of competence in computer and electricity electronics technologies.
Prerequisite: Ed. IA 270.

Ed. IA 441. Industrial Arts—Woodwork 6 hrs. (half year)

Maintenance work (shop and equipment); refinishing; building construction.
Prerequisites: Ed. IA 242 and 342.

Ed. IA 460. Technology II (2-4; 2-4)

Development of competence in the areas of materials and processes and power technologies.
Prerequisite: Ed. IA 270.

Ed. IA 470. Technology III (2-4; 2-4)

Development of competence in graphic communications and mechanical technologies.
Prerequisite: Ed. IA 270.

Ed. IA 589. Organization of Industrial Arts Education (3-0; 0-0)

Ed. IA 591. Problems and Trends in Industrial Arts Education (0-0; 3-0)

Ed. IA 594. Research and Development Seminar in Industrial Arts Education (3-0; 3-0)

VII. VOCATIONAL EDUCATION (Voc. Ed.)

Ed. Voc 204. Vocational Education (3-0; 3-0)

History, comparative studies, aims and objectives.

Ed. Voc 280. Curriculum and Instruction in Vocational Education (3-0; 3-0)

General principles of teaching; specialized methods; trade and job analysis; course construction; instructional materials and their use; tests and evaluation; vocational guidance.

Ed. Voc 350. Educational Programs and Practices in Industry and Labor (3-0; 3-0)

Scope, organization, practice and evaluation, of educational programs conducted by management and labor.

Ed. Voc 404. Vocational Education (3-0; 3-0)

Orientation to vocational education.

Ed. Voc 480. Curriculum and Instruction: Vocational Education (3-0; 3-0)

General principles of teaching; specialized methods; trade and job analysis; course construction; instructional materials and their use; tests and evaluation; vocational guidance.

Ed. Voc 550. Vocational Guidance—Conference Seminar (1-3; 1-3)

Ed. Voc 589. Organization of Vocational Education (3-0; 0-0)

Ed. Voc 591. Problems and Trends in Vocational Education (0-0; 3-0)

Ed. Voc 594. Research and Development Seminar in Vocational Education (3-0; 3-0)

ART

200. Introduction to the History of Art (3-0; 3-0)

Beginning with a discussion of fundamental concepts underlying painting and the plastic arts, this course investigates the major styles and contributions of each important period.

230. Principles of Design and Composition (1-4; 1-4)

The study and practical application of principles of composition and picture-making, methods of construction in design, and the use of conventional and abstract forms.

BIOLOGICAL SCIENCE

Biology 130. (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biology 230. (3-3; 3-3)

1st Term or 2nd Term

Plant form and function—an intermediate course on comparative morphology and physiology of plants at an intermediate level.

2nd Term or 1st Term

Comparative Zoology—an intermediate course on Animal morphology, physiology and development at an intermediate level.

Prerequisite: Biology 30 or 130.

DRAMA

250. Elementary Acting and Stagecraft (3-1; 3-1)

(a) Acting: Practical and theoretical through improvisation, stage performance and discussion. Emphasis is placed on the development of the actor through preparation for a role, acting scenes, and basic speech and body work. Elementary makeup.

(b) Practical work in acting and technical practice.

ENGLISH

200. A survey of English Literature from Chaucer to the Twentieth Century (3-0; 3-0)

A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

Authors: Chaucer, More; Shakespeare, Jonson, Milton; Defoe, Pope, Swift; Wordsworth, Keats, Brontë, Tennyson, Browning; Yeats or Eliot, O'Casey or Shaw, Golding or Orwell. Other required reading: *Everyman* and appropriate selections of lyric verse.

210. English Language and Literature (3-0; 3-0)
English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

288. An Introduction to the English Language (3-0; 3-0)
An historical and structural study of the sounds, grammar, and vocabulary of English.

398. Children's Literature (3-0; 3-0)
A historical and critical study of literature written for children, with attention to the interaction between children's literature and educational theory. The course will bring to the attention of prospective elementary teachers some of the world's resources in good books for children.
Prerequisite: English 200, 210, or 230. This course is limited to B.Ed. students in the elementary route.

FRENCH

201. First Year University French for Teachers (2-3; 2-3)
This course is designed to teach all future teachers of French to speak the language. It consists of 3 laboratory hours or oral work, and two hours of grammar per week.

HOUSEHOLD ECONOMICS

202. Textiles and Clothing (3-3; 3-3)
A study of the composition, manufacture and properties of fabrics, their use and care. The selection of clothing in relation to the individual. The use of commercial patterns in garment construction. Fitting. Sewing techniques as they apply to specific fabrics and to various types of garments.

210. Foods and Nutrition (3-3; 3-3)
An elementary study of the composition and nutritive value of foods, with laboratory practice in food preparation, meal planning and service.

303. Household Management (0-0; 3-3)
Materials found in the home; principles involved in their care; the house, its equipment and furnishings; labor-saving devices.

350. Applied Art (3-3; 3-3)
A study of the principles of design and the theory of color. Creative problems including block printing, stencilling, stitchery, and other techniques. Historic styles of architecture and furniture and their relation to modern design. The planning of a contemporary house and its furnishings.

453. Family Finance (3-0; 0-0)
Standards of living; family income, savings and expenditures; consumer economics and consumer education.

460. Advanced Clothing (3-3; 3-3)
The study of historic and contemporary costume design. The development of the foundation pattern. Flat pattern designing, draping and tailoring for selected garments and construction in appropriate fabrics.
Prerequisite: H.Ec. 202.

462. Advanced Clothing (3-3; 3-3)

The study of historic and contemporary costume design. The development of the foundation pattern. Flat pattern designing for selected garments and construction in appropriate fabrics.

Prerequisite: H.Ec. 202.

464. Nutrition and Experimental Cookery (3-3; 3-3)

Advanced study of the principles of nutrition and of food preparation. The laboratory work will be mainly experimental cookery.

Prerequisite: Chemistry 250 or Chemistry 350 and Household Economics 210.

MATHEMATICS

180. Trigonometry and Polynomial Calculus (4-0; 4-0)

Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentiation and integration of elementary functions. Applications.

Prerequisite: Mathematics 30 or its equivalent.

207. Elementary Calculus (Arts and Education) (5-0; 5-0)

Real numbers. Functions and graphs. Differentiation and applications. Analytic geometry. Integration and applications. Trigonometric, exponential and inverse functions.

Prerequisite: Mathematics 30 and 31 or their equivalent.

Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 207 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101).

220. Elementary Calculus (3-0; 3-0)

Differentiation and integration of trigonometric functions. Polar co-ordinates. Logarithmis and exponential functions. Conic sections. Areas and volumes.

Prerequisite: Mathematics 180.

264. Foundations of Mathematics (3-0; 3-0)

Axiomatics. Sets and relations. Elementary logic. Classical and modern views of geometry. The number system. Systems of numeration and scales of notation. Measurement.

Prerequisite: Mathematics 30 of high school or permission of the Dean.

NOTE: Credit may not be obtained in both Mathematics 264 and Mathematics 274.

274. Algebra and Geometry (3-0; 3-0)

Logic and sets. Axiomatic geometry. Projective geometry. Rotation of axes. Graphs of polynomial functions. Linear equations. Vectors, matrices and determinants. Mathematical systems (scales of notation). Mathematical induction. Binomial theorem. The axiomatic approach to the number system. General algebraic systems.

Prerequisite: Mathematics 30.

307. Calculus and Analytic Geometry (Arts and Education) (5-0; 5-0)

Polar coordinates. Rotation of axes. Analytical geometry of three dimensions.

Partial derivatives. Multiple integrals. Sequences and series. Introductory differential equations.
Prerequisite: Mathematics 207.

374. Algebra and Geometry (3-0; 3-0)
Selected topics in projective and other non-euclidean geometries. Groups, rings, fields. Vector spaces. Lattices and Boolean algebra.
Prerequisite: Mathematics 207 and 274 or consent of the department.

MUSIC

200. History of Music and Choral Technique (2-3*; 2-3*)
Elementary theory and practice of singing, choral technique and interpretation, sight singing and ear training. History of music. Introduction to form. Instruments of the orchestra. Assignments include one hour weekly of prescribed listening; records and scores are provided and the listening room is reserved at various times for small groups. Weekly reading will be assigned, part of it related to the listening.
Theory: The student will be required in March (of the session in which the course is taken), to pass an elementary examination in notation with 80% standing.
Textbooks: Staton, *Sweet Singing in the Choir;* Martin Bernstein, *An Introduction to Music;* Horwood, *Basis of Music.*
*Laboratory: Choral and listening.
Prerequisite: (a) Western Board of Music Grade III theory or equivalent *and*
(b) Western Board of Music Grade V practical or equivalent.

210. Foundations of Music (2-3; 2-3)
The development of a musical repertory and knowledge of basic content appropriate for teachers. (Open to B.Ed. students lacking the prerequisite for Music 200; not to be used as a prerequisite (in place of Music 200) for advanced courses in music.)
Offered for the first time at the 1964 summer session.

PHYSICAL EDUCATION

P.E. 202. Introduction to Elementary School Physical Education (3-3; 3-3)
A study of children at play. Movement education leading to the development of skill in various fields of physical activity.

P.E. 232. Physical Education Curriculum and Instruction (3-3; 3-3)
(secondary)
Planning and teaching secondary school physical education with emphasis on basic activities and intramural athletics.

P.E. 325. Elementary Anatomy and Physiology of Exercise (3-0; 0-0)
Prerequisite: P.E. 200.

P.E. 327. Educational Dance (0-0; 0-3)
A study of the basic principles of movement and the use of these in the communication of ideas and feelings.
Prerequisite: P. E. 200.

P.E. 332. Principles of Physical Education (Secondary) (3-3; 3-3)
Analysis of factors derived from foundation sciences and philosophies as they affect activity selection and basic objectives at the secondary school level. Laboratory experiences include track and field, dance and gymnastics.

P.E. 336. Activity Course
Theory, practice and teaching of gymnastics, track and field, folk and social dance. International folk dance (women) and football (men). Comprises P.E. 211, 307, 401, 407, 417.

(a) 211. Activity Course (0-0; 0-3)
Theory, practice and teaching of tumbling and apparatus.

(b) 307. Activity Course (0-3; 0-0)
Theory, practice and teaching of folk and social dance.

(c) 401. Activity Course (0-3; 0-0)
Theory, practice and teaching of track and field with emphasis on coaching techniques, organization and officiating of meets.

(d) 407. Activity Course (Women) (0-3; 0-0)
Comprehensive study of international folk dance.

(e) 417. Activity Course (Men) (0-3; 0-0)
Theory, practice, teaching and coaching of football.

P.E. 337. Physical Education Curriculum and Instruction (Elementary) (1-2; 0-0)
Methods and materials in the teaching of elementary school health and physical education.

P.E. 392. Health Education in Secondary Schools (3-0; 3-0)
Personal and environmental school health with special emphasis on methods and materials in health instruction.

P.E. 421. Individual and Team Activities (3-2; 0-0)
Prerequisite: P.E. 200.

P.E. 423. Problems and Trends in Elementary School Health and Physical Education (0-0; 3-0)
Prerequisite: P.E. 200 and P.E. 329.

P.E. 427. Advanced Educational Gymnastics and Games (3-3; 0-0)
In addition to the practical work students will be expected to undertake an independent study of some topic related to their chosen field of study.
Prerequisite: P.E. 200.

P.E. 429. Advanced Educational Dance and Dance Drama (3-3; 0-0)
In addition to the practical work students will be expected to undertake an independent study of some topic related to their chosen field of study.
Prerequisite: P.E. 200 and P.E. 327.

P.E. 431. Swimming (0-0; 1-2)
Methods of teaching beginning swimming and diving.
Prerequisites: P.E. 200 and Junior Red Cross Swimming award or equivalent.

P.E. 436. Activity Course

Theory, practice and teaching of aquatics, gymnastics, badminton, curling. Skiing, hockey, and wrestling (men), skating and modern dance (women). Comprises P.E. 215, 311, 403, 405, 409.

(a) 215. Activity Course (0-0; 0-3)
Theory, practice and teaching of aquatics with emphasis on fundamental skills and stroke techniques.

(b) 311. Activity Course (0-0; 0-3)
Theory, practice and teaching of tumbling and apparatus. Emphasis on class organization and teaching methods.

(c) 403. Activity Course (0-0; 0-3)
Theory, practice and teaching of badminton, curling and skiing.

(d) 405. Activity Course (Women) (0-0; 0-3)
The study of techniques, improvisation and composition of modern dance.

(e) 409. Activity Course (Men) (0-0; 0-3)
Theory, practice, teaching and coaching of hockey and wrestling.

P.E. 442. Organization and Administration of Health and Physical Education (3-0; 3-0)
An analysis of factors involved in planning, directing, staffing, co-ordinating, budgeting and reporting with respect to comprehensive junior and senior high school programs in health instruction, the required program, intramural sports and interscholastic athletics.

P.E. 492. Community Health (3-2; 3-2)
Consideration of current research of disease concepts and examination of community attitudes and pressures affecting health education. Field research includes hospitals, clinics, institutions and schools.

ZOOLOGY

Members of the staff of the Department of Zoology, Faculty of Science.

222. Natural History of Alberta Animals (3-3; 3-3)
Identification and natural history of the more common vertebrate and invertebrate animals found in Alberta; outline of classification; methods of collection and preservation; care of captive animals; other aspects of natural history techniques.

(Summer Sessions Only.)

XIII

The Faculty of Engineering

VII—INFORMATION, REGULATIONS, COURSES

ACADEMIC STAFF OF FACULTY OF ENGINEERING

Dean—R. M. Hardy
Associate Dean—L. E. Gads

Edmonton Campus

Department of Chemical and Petroleum Engineering

Professors—D. B. Robinson (Head of the Department), D. L. Flock, D. Quon
Associate Professors—I. G. Dalla Lana, P. M. Dranchuk, L. U. Lilleleht, W. Nader*, F. D. Otto, R. A. Ritter
Assistant Professor—D. G. Fisher
Sessional Instructors

Department of Civil Engineering

Professors—S. R. Sinclair (Head of Department), T. Blench, L. E. Gads, R. M. Hardy, J. Longworth
Associate Professors—K. O. Anderson, J. J. Bakker, W. L. Bigg, P. H. Bouthillier, E. W. Brooker, E. L. Fowler, J. G. MacGregor, D. W. Murray*, J. B. Nuttall, A. W. Peterson, W. W. Preston, S. H. Simmonds, S. Thomson, J. P. Verschuren, J. Warwaruk
Assistant Professors—P. F. G. Adams*, M. J. Baron*
Sessional Instructors

Department of Electrical Engineering

Professors—G. B. Walker (Head of Department), J. W. Porteous, J. A. Harle**
Associate Professors—D. H. Kelly*, Y. J. Kingma, R. E. Phillips**, W. A. G. Voss
Assistant Professors—R. W. King, T. V. Nguyen, W. Sinnema, R. A. Stein, K. A. Stromsmoe
Sessional Instructors

Department of Mechanical Engineering

Professor—G. Ford (Head of Department)
Associate Professors—J. B. Haddow, J. S. Kennedy, G. S. H. Lock, D. Panar, C. M. Rodkiewicz*, G. W. Sadler
Assistant Professors—D. G. Bellow, K. C. Cheng, A. Eshel*, E. W. Johnson, D. W. Pashniak
Sessional Instructors

Department of Mining and Metallurgy

Professors—E. O. Lilge (Head of Department), J. Leja*, T. H. Patching
Associate Professor—W. V. Youdelis
Assistant Professor—
Sessional Instructors

Calgary Campus

Division of Engineering

Professors—A. M. Neville (Chairman of Division), G. W. Govier**
Associate Professors—H. A. R. de Paiva, P. Glockner, H. R. McArthur*, W. H. Stillwell*
Assistant Professors—A. G. Doige, R. E. Loov, J. E. S. Venart

*On leave of absence. **Part time.

FACULTY OF ENGINEERING

The Faculty of Engineering administers regular four-year programs leading to the B.Sc. Degree in Chemical, Civil, Electrical, Mechanical, Metallurgical, and Mining Engineering. Special patterns are available in the third and fourth years of some of these programs. In addition, for students obtaining a sufficiently high standing in the work of the first two years programs are available leading to the B.Sc. Degree in Engineering Physics. Details of all these courses appear under Programs of Study. Instruction in the first two years of Engineering is offered both at the Calgary and the Edmonton campus of the University. Instruction in the third and fourth years of Engineering is available only at the Edmonton campus.

Graduate work leading to the M.Sc., and in some cases the Ph.D., degree is offered through the various Engineering Departments under the administration of the Faculty of Graduate Studies. Details of these programs appear in the calendar of the Faculty of Graduate Studies.

ADMISSION REQUIREMENTS FOR PROGRAMS LEADING TO THE B.SC. DEGREE IN ENGINEERING

1. For students who have attended and are completing High School in Alberta, examinations for admission to the University are conducted each year, in June and August, under the authority of the High School and University Matriculation Examinations Board. Applications for these examinations should be made about two months before the date of examinations to the Chairman of the High School and University Matriculations Board, Department of Education, Administration Building, Edmonton.
2. The standard required for admission to the first year of Engineering is—
   (a) an Alberta High School Diploma with
   (b) a Departmental examination mark of 50% or higher in each of the following six courses:
      (1) Chemistry 30*
      (2) English 30
      (3) Mathematics 30
      (4) Mathematics 31
      (5) Physics 30
      (6) Social Studies 30, and
   (c) an average in these courses of at least 60.0%.

Note: Heretofore, French 30 or German 30 or Latin 30 has been required in addition to the foregoing. In September 1964, if an applicant has credit in one of these languages, and it would be to his advantage to include his mark in it in computing his average, this will be done.

*Students who have passed Chemistry 30 without approved laboratory will be required to satisfy the Department of Chemistry as to their proficiency in laboratory work.

3. Students who have completed their High School work outside Alberta will be judged on the Alberta matriculation standard with their High School credits being evaluated by the Registrar and the Dean.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

PROCEDURE FOR APPLYING FOR ADMISSION

1. Students who have not previously been registered in the Faculty of Engineering should write to the Registrar and request the application forms and descriptive material.
2. Students who completed the bulk of their high school work two or more years prior to the time of application are required to consult the Dean and the Student Counselling Services by July 31st.
3. The application forms should be completed in all detail and submitted with appropriate fee* to the Registrar by August 4.
4. Students are required to arrange with the Examinations Branch of the Department of Education of the province where their High School Training was obtained for the direct transmission by the Department to the Registrar of two copies of the complete transcript of their High School work by August 4.
5. Applications must be completed and accompanied by copies of the transcript before they can be accepted. They will be reviewed by the Registrar and the Dean and the applicant will be notified by the Registrar of his acceptability or otherwise.
6. Students who have previously registered in the Faculty of Engineering are not required to reapply for admission to subsequent years and may assume that they are readmissible unless they have been otherwise informed by the Registrar or the Dean.

REGISTRATION

1. All students must register in person at the prescribed time before the start of classes.
2. Students who have been admitted to the Faculty of Engineering for the first time will be informed of the time and place of registration by the Registrar at the time they receive notice of admission.
3. A student is responsible for the completeness and accuracy of his registration. He is also responsible for any adjustment of registration made necessary by the results of supplemental examinations. Particular care should be exercised with regard to the selection of options and patterns where they are available. Registration in courses which directly conflict on the timetable will only be allowed when the permission of the Dean has been secured.

---

*A fee of $5.00 is charged for the evaluation of high school documents from provinces other than Alberta; a fee of $10.00 is charged for the evaluation of high school documents from outside Canada.

4. Students with registration problems are requested to consult the Dean.
5. Late registration is permitted only in exceptional cases and with the approval of the Dean. If late registration is approved a late registration fee of $3.00 plus $1.00 per day is levied.
6. Registration is incomplete until fees have been paid, and is subject to cancellation unless payment has been made by the final date noted in the academic schedule.

PROMOTION REGULATIONS OF FACULTY OF ENGINEERING

1. A student who has obtained credit in all but one of the courses prescribed for him in any year may be permitted registration in the subsequent year of the program but, if so, will be required to register in and repeat the failed course.
2. A student who has not obtained credit in all or all but one of the courses prescribed for him in any year is considered to have failed his year and will be denied registration in the subsequent year of the program.
3. A student who has failed two or more of the courses prescribed for him in any year may under special circumstances be permitted to repeat the failed year. Credit may be given in one or more courses previously taken and passed with a grade of 65 percent or higher. In such cases the student may be required to register in additional courses not more than one of which may be a course prescribed in a subsequent year of his program.
4. A student permitted to repeat a failed year who fails to produce a satisfactory record in the first-term examinations in the repeated year, will be required to withdraw from the Faculty and will be denied further registration in Engineering.
5. A student who has obtained credit in all of the courses prescribed for him in the second year of a program may be permitted registration in the third year of a different program but, if so, will be required to register in any course prescribed for the second year of the new program in which he does not have credit.
6. A student will be denied further registration in Engineering if after three academic years he has not qualified for registration in the third year of his program.

WEIGHTING OF GRADES

In the computation of student averages for scholarship and other purposes the grades obtained in individual courses are weighted in accordance with weighting factors representing the sum of

(a) the number of hours per week of lectures for each term, plus
(b) from one-third to one-half the number of hours per week of laboratory for each term.

FIRST YEAR ENGINEERING

All Programs

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Math. 202	Elementary Mathematics	4	0	4	0
Phys. 230	Mechanics, Electricity and Magnetism	3	3/2	2	3/2
Chem. 232	Modern Chemistry	3	3	3	3
D.G. 151	Drafting and Graphics	0	3	2	4
E.M. 150	Engineering Mechanics (Statics)	3	3/2	0	0
E.M. 151	Engineering Mechanics (Particle Dynamics)	0	0	3	0
Engl. 250	English	2	0	2	0
C.E. 153	Surveying	0	0	1	0
		plus 3½ weeks*			
Phys. Ed.	Physical Education	0	2	0	2
Eng.P. 159	Orientation to Engineering Profession	1	0	0	0
	Total Hours—	16	11	17	10½

*Survey School, 3½ weeks duration after the end of final examinations in preceding courses.

SECOND YEAR ENGINEERING

Required Courses — All Programs

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Math. 303	Calculus	3	2	3	2
Phys. 330	Mdn. Phys, Wave Motion and Elec.	3	3/2	3	3/2
Chem. 371	Physical Chemistry	3	1S	0	0
E.M. 251	Engineering Mech. (Dynamics)	2	0	2	0
C.E. 262	Strength of Materials	2	4/2	2	4/2
E.E. 252	Electrical Circuits	2	3/2	2	3/2
Met.E. 252	Engineering Materials I	2	0	0	0
Ch.E. 252	Engineering Materials II	0	0	2	0
Geol. 230	Geology	0	0	3	0
	Total Hours—	17	8	17	7

THIRD YEAR — CHEMICAL ENGINEERING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Ch.E. 361	Unit Operations I	2	3/2	2	3/2
Ch.E. 365	Industrial Stoichiomestry	2	1	0	0
Ch.E. 367	Chem. Eng. Thermodynamics I	0	0	3	1
Chem. 352	Organic Chemistry	3	2	3	2
Chem. 472	Elementary Physical Chemistry	3	3	3	3
Econ. 302	Principles of Economics	3	0	3	0
E.E. 303	Elements of Elec. Engineering	2	3/2	0	0
Math. 406	Advanced Calculus	3	0	3	0
C.S. 300	Compiler Language Programming	0	0	1	3
	Total Hours—	18	9	18	10½

FOURTH YEAR — CHEMICAL ENGINEERING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Ch.E. 461	Unit Operations II	3	2	3	2
Ch.E. 463	Chem. Engr. Laboratory	0	4/2	0	4/2
Ch.E. 464	Applied Reaction Kinetics	0	0	3	0
Ch.E. 465	Chem. Engr. Project	0	2	1	4
Ch.E. 467	Chem. Engr. Thermodynamics II	3	1	0	0
Ch.E. 469	Economics and Design of Chem. Proc.	2	3/2	0	0
Ch.E. 472	Colloquium	0	1	0	1
Ch.E. 474	Industrial Tours	0	0	0	0
Eng.P. 459	Practice of the Engineering Profession	0	0	1	0
Group A	Non-Technical Elective	3	0	3	0
Group B	Technical Elective Pattern(1,2)	6	3/2	6	3/2
	Total Hours(2)—	17	11	17	10½

Notes—:

(1) Selection to be approved by Head of Department of Chemical and Petroleum Engineering.

(2) Hours are approximate depending upon optional courses selected.

(Elective Courses Applicable as Indicated Above)

Group A—Non-Technical Elective

A list of non-technical courses approved by the Department of Chemical and Petroleum Engineering, is available at the time of registration at the Department office.

Group B—Technical Elective Pattern

One technical elective pattern is to be selected from the following:

Chemistry Pattern

Chem. 452	Organic Chemistry	3	0	3	0
Chem. 432	Inorganic Chemistry	3	0	3	0

Mathematics Pattern

Math. 408	Functions of Complex Variables	3	0	0	0
C.S. 458	Numerical Analysis	0	0	2	2
Ch.E. 477	Mathematical Applications	3	0	0	0
Ch.E. 478	Stat. Methods in Chem. Eng.	0	0	3	3/2

Dynamics Pattern

Ch.E. 466	Control Theory	0	0	3	0
Ch.E. 476	Process Dynamics	3	3/2	3	3/2
Ch.E. 477	Mathematical Applications	3	0	0	0

Petroleum Pattern

Pet.E. 482	Reservoir Mechanics I	3	3/2	0	0
Pet.E. 483	Reservoir Mechanics II	0	0	3	3/2
C.S. 458	Numerical Analysis	0	0	2	2
Ch.E. 477	Mathematical Applications	3	0	0	0

Industrial Pattern

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Ch.E. 478	Statistical Methods in Chem. Engr.	0	0	3	3/2
Ch.E. 479	Instrumentation	3	3/2	0	0
Prod. 302	Fundamentals of Production	2	0	2	0

In consultation with the Department of Chemical and Petroleum Engineering, other combinations of the above courses or other suitable courses in science or engineering may be selected to complete the elective pattern.

PETROLEUM ENGINEERING

Two courses in Petroleum Reservoir Mechanics are available to students in the senior years of the programs in Chemical and in Mechanical Engineering to enable them better to prepare for careers in the petroleum production industry.

A graduate program leading to the Master of Science degree in Petroleum Engineering is offered and is open to students graduating with Bachelor of Science degrees in any branch of engineering.

THIRD YEAR — CIVIL ENGINEERING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
C.E. 333	Fluid Mechanics	2	3/2	2	3/2
C.E. 340	Soil Mechanics	0	0	2	0
C.E. 350	Geodesy and Photogrammetry	2	3/2	2	3/2
C.E. 360	Theory of Structures	2	0	2	0
C.E. 362	Elements of Structural Design	2	3	2	3
C.E. 380	Engineering Mechanics	3	0	3	0
E.E. 301	Elements of Electrical Eng.	0	0	2	3/2
Mech.E. 343	Thermodynamics	0	0	3	0
C.S. 300	Compiler Language Programming	1	3	0	0
Geol. 330	Engineering Geology	3	3	0	0
Economics 303	Principles of Economics	2	0	2	0
	Total Hours—	17	12	20	7½

FOURTH YEAR — CIVIL ENGINEERING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Eng.P. 459	The Practice of the Engineering Profession	0	0	1	0
C.E. 420	Water Supply and Sewerage	2	3/2	2	3/2
C.E. 436	Hydrology and River Engineering	0	0	3	3
C.E. 440	Foundations and Earth Structures	2	0	2	0
C.E. 441	Soil Mechanics Laboratory	0	3	0	3
C.E. 455	Concrete Technology	2	2	0	0
C.E. 459	Prac. Experience or Project	0	0	0	0
C.E. 460	Theory of Structures	2	0	0	0
C.E. 463	Reinforced Concrete Design I	3	3	0	0
Electives from[4]					
	Group A	2	3/2	2	3/2
	Group B	3	0	0	0
	Group C	0	0	3	3
	Group D	0	0	3	0
	Total Hours[1]—	16	11	16	12

Elective Courses Referred to Above[2][3]

Group A—each student will take

Either C.E. 410	Highway Engineering	2	3/2	2	3/2
or C.E. 411	Highway Engineering	2	0	2	0
C.E. 431	Senior Hydraulics Laboratory	0	3/2	0	3/2

Group B—each student will take **one** of

C.E. 422	Sanitary Engineering Laboratory	1	3	0	0
C.E. 430	Senior Fluid Mechanics I	3	0	0	0
C.E. 462	Advanced Strength of Materials	3	0	0	0
C.S. 458	Numerical Analysis and Modern Computational Methods	2	2	0	0

Group C—each student will take **one** of

C.E. 434	Water Power Engineering	0	0	3	3
C.E. 464	Reinforced Concrete Design II	0	0	2	3
Geol. 466	Glacial Geology	0	0	3	3

Group D—each student will take **one** of

C.E. 425	Municipal Engineering	0	0	3	0
C.E. 435	Senior Fluid Mechanics II	0	0	3	0
C.E. 466	Numerical and Approximate Methods of Structural Analysis	0	0	3	0

Notes:—

(1) Hours are approximate and depend on options selected.

(2) Students particularly interested in Structures should register in C.E. 462, C.E. 464 and C.E. 466.

(3) Students particularly interested in Fluid Mechanics should register in C.E. 431, C.E. 430 and C.E. 435.

(4) Each student must choose electives from each of Groups A, B, C and D as indicated.

THIRD YEAR — ELECTRICAL ENGINEERING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
C.E. 334	Fluid Mechanics	3	3/2	0	0
Mech.E. 342	Applied Therm. and Heat Transfer	0	0	3	0
E.E. 312	Fund. of Electrical Engineering	3	3/2	3	0
Econ. 302	Princ. of Econ.	3	0	3	0
E.E. 330	Electrical Machinery I	2	3/2	2	3/2
E.E. 350	Electrical Circuits	2	3/2	2	3
E.E. 370	Engineering Electronics	2	3/2	2	3/2
Math. 405	Advanced Calculus	3	0	3	0
C.S. 300	Compiler Language Programming	0	0	1	3
	Total Hours—	18	7½	19	9

FOURTH YEAR ELECTRICAL ENGINEERING

Power and Electronics Patterns

Required Courses (All Patterns)

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Math. 408	Functions of Complex Variable	0	0	3	0
E.E. 401	Electrical Design	3	0	0	0
E.E. 458	Electrical Laboratories	0	9	0	9
E.E. 461	Linear System Analysis	3	0	3	0
E.M. 453	Mechanical Vibrations	3	0	0	0
Eng.P. 459	The Practice of the Engineering Profession	0	0	1	0
Phys. 530	Modern Physics	2	0	2	0
	Subtotal Hours—	11	9	6	9

Additional Courses: Power Pattern

E.E. 465	Feed Back Systems	0	0	3	0
E.E. 421	Electrical Power Transmission	3	0	0	0
E.E. 431	Electrical Machinery II	3	0	0	0
Group A	Any three courses [1,2]	0	0	9	0
	Subtotal Hours[2]—	6	0	12	0
	Total Hours[2]—	17	9	18	9

Additional Courses: Electronics Pattern

E.E. 471	Electronic Circuits	3	0	0	0
E.E. 491	Guided Waves	3	0	0	0
Group B	Any four courses[1,2]	0	0	12	0
	Subtotal Hours[2]—	6	0	12	0
	Total Hours[2]—	17	9	18	9

(Optional Courses Applicable As Indicated Above)

Group A

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
E.E. 407	High Voltage Engineering	0	0	3	0
E.E. 425	Power System Planning	0	0	3	0
E.E. 445	Elec. Instruments and Relays	0	0	3	0
Mech.E. 405	Power Plant Design	0	0	3	0
C.S. 458	Numerical Analysis and Modern Computational Methods	0	0	2	2

Group B

E.E. 465	Feed Back Systems	0	0	3	0
E.E. 473	Transistor Circuits	0	0	3	0
E.E. 475	Gen. of High Frequencies	0	0	3	0
E.E. 477	Pulse and Waveshaping Circuits	0	0	3	0
E.E. 479	Switching Circuits and Logical Design	0	0	3	0
E.E. 485	Acoustics	0	0	3	0
E.E. 495	Radiation, Antennas and Propagation	0	0	3	0
E.E. 497	Microwave Measurements	0	0	3	0
C.S. 458	Numerical Analysis and Modern Computational Methods	0	0	2	2

Notes:—

(1) Selection to be approved by Head of Department of Electrical Engineering.

(2) Hours are approximate depending upon optional courses selected.

THIRD YEAR — MECHANICAL ENGINEERING

Required Courses

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
F.M. 335	Fluid Mechanics I	2	0	0	0
F.M. 336	Fluid Mechanics II	0	0	2	0
Econ. 303	Principles of Economics	2	0	2	0
E.E. 302	Elec. Engineering Elements	3	3/2	3	3/2
Math. 407	Advanced Calculus	3	0	3	0
Mech.E. 301	Mechanical Meausrements Laboratory	1	3	1	3
Mech.E. 340	Thermodynamics I	2	0	2	0
Mech.E. 360	Mechainics of Machines	2	3/2	2	3/2
Met.E. 361	Physical Metallurgy	2	3/2	2	3/2
E.M. 355	Advanced Strength of Materials I	0	0	3	0
C.S. 300	Compiler Language Programming	1	3	0	0
	Total Hours—	18	10½	20	7½

FORTH YEAR — MECHANICAL ENGINEERING

Required Courses

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
E.M. 452	Mechanical Vibrations	0	0	3	0
E.M. 455	Advanced Strength of Materials II	3	0	0	0
Mech.E. 401	Mechanical Engineering Laboratory	0	3	0	3
Mech.E. 421	Applied Thermodynamics	3	0	0	0
Mech.E. 436	Applied Gas Dynamics	0	0	3	0
Mech.E. 462	Principles of Design	2	3/2	0	3
Mech.E. 470	Heat Transfer I	3	0	0	0
E.E. 469	Feedback Control Systems	0	0	3	3/2
Eng.P. 459	Practice of Engineering Profession	0	0	1	0
	Subtotal Hours—	11	4½	10	7½

Additional Courses: Option I

Select any 3 groups from the following:

Group					
A*	Prod. 310	Production Management	3	0	3	0
B*	B 250	Admin. Principles and Management	3	0	3	0
C	C.E. 434	Water Power Engineering	3	3	0	0
	Mech.E. 405	Power Plant Engineering	0	0	3	0
D	Pet.E. 482	Reservoir Mechanics I	3	3/2	0	0
	Pet.E. 483	Reservoir Mechanics II	0	0	3	3/2
		Subtotal Hours—	9	3	9	0
		Total Hours(1)—	20	7½	19	7½

*In consultation with the Department of Mechanical Engineering, other suitable courses in production and business administration may be substituted for those shown in Group A and B.

Additional Courses: Option II

Select Group A and any 1 of the remaining groups of courses:

Group						
A	C.S. 458	Num. Analysis and Comp. Methods	0	0	2	2
	Math. 408	Functions of a Complex Variable	3	0	0	0
B	Math. 480	Matrices and Cartesian Tensors	3	0	0	0
	E.M. 460	Mechanics of Solids	0	0	3	0
C	Mech.E. 440	Thermodynamics II	3	0	0	0
	Mech.E. 471	Heat Transfer II	0	0	3	0
D	Pet.E. 482	Reservoir Mechanics I	3	3/2	0	0
	Pet.E. 483	Reservoir Mechanics II	0	0	3	3/2
E	C.E. 430	Senior Fluid Mechanics I	3	0	0	0
	C.E. 435	Senior Fluid Mechanics II	0	0	3	0
		Subtotal Hours—	6	0	5	2
		Total Hours(1)—	17	4½	15	9½

(1) Hours are approximate depending upon option selected.

DEPARTMENT OF MINING AND METALLURGY

THIRD YEAR — METALLURGY

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Met.E. 361	Physical Metallurgy	2	3/2	2	3/2
Math. 407	Advanced Calculus	3	0	3	0
Chem. 472	Physical Chemistry	3	3	3	3
Met.E. 333	Extractive Metallurgy I	3	3/2	3	3/2
Econ. 303	Principles of Economics	2	0	2	0
Ch.E. 361	Unit Operations I	2	3/2	2	3/2
Geol. 404	Mineralogy	3	3	0	0
C.S. 300	Compiler Language Programming	0	0	1	3
	Total Hours—	18	10½	16	10½

FOURTH YEAR — EXTRACTIVE METALLURGY

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Met.E. 437	Extractive Metallurgy II	2	3	2	3
Met.E. 438	Kinetics	2	0	0	0
Met.E. 460	Fundamental of Physical Metal.	3	3	3	0
Met.E. 430	Properties of Surfaces	3	0	0	0
Met.E. 439	Extractive Metal. Project and Design	0	3	0	6
Geol. 460	Metallic Mineral Deposits	0	0	3	3
Phys. 416	Wave Mechanics and Solid State	2	0	2	0
Chem. 471	Electro Chemistry	0	0	2	0
Chem. 434	Inorganic Chemistry	3	3	3	0
Eng. Prof. 459	The Prac. of the Eng. Profession	0	0	1	0
Met.E. 404	Practical Experience	0	0	0	0
	Total Hours—	15	12	16	12

FOURTH YEAR — PHYSICAL METALLURGY

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Phys. 416	Wave Mechanics and Solid State	2	0	2	0
Math. 320	Stat. Treat. of Experimental Data	1	0	1	0
Math. 480	Matrices and Cartesian Tensors	3	0	0	0
E.M. 460	Mechanics of Solids	0	0	3	0
Met.E. 430	Properties of Surfaces	3	0	0	0
Met.E. 467	Plant Operation and Design	0	0	2	3
Met.E. 460	Fundamentals of Phys. Metal.	3	3	3	0
Met.E. 461	Applic. of Phys. Metallurgy	3	3	3	0
Eng.P. 459	The Prac. of the Eng. Profession	0	0	1	0
Met.E. 466	Phys. Metal Research Project	0	6	0	9
Met.E. 404	Practical Experience	0	0	0	0
		15	12	15	12

Note:—

For 1964-65 Met.E. 437 and Met.E. 438 temporarily replace Math. 320 and Met.E. 467.

THIRD YEAR — MINING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Met.E. 361	Physical Metallurgy	2	3/2	2	3/2
Math. 407	Advanced Calculus	3	0	3	0
E.E. 301	Electrical Engineering	0	0	2	3/2
M.E. 303	Introduction to Mining	2	3/2	0	0
M.E. 304	Rock Mechanics and Explosives	0	0	2	0
Met.E. 333	Extractive Metallurgy I	3	3/2	3	3/2
Econ. 303	Principles of Economics	2	0	2	0
Chem. 361	Unit Operations I	2	3/2	2	3/2
Geol. 404	Mineralogy	3	3	0	0
C.S. 300	Compiler Language Programming	0	0	1	3
		17	9	17	9

FOURTH YEAR — MINING ENGINEERING

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
C.E. 362	Elements of Structural Design	2	3	2	3
Eng.P. 459	The Prac. of the Eng. Profession	0	0	1	0
Geol. 350	Petrology	0	3	0	0
Geol. 460	Metallic Mineral Deposits	0	0	3	3
Mech.E. 342	Thermodynamics	3	0	0	0
Met.E. 430	Properties of Surfaces	3	0	0	0
Met.E. 440	Hydrometallurgy	0	0	2	3/2
Met.E. 433	Mill Design	0	0	0	3
M.E. 400	Mining Methods	3	0	3	0
M.E. 401-403	Mine Design	0	3	0	6
M.E. 404	Practical Experience	0	0	0	0
M.E. 441	Rock Mechanics Lab.	0	3	0	0
	Option	3	0	3	0
		14	12	14	16½

Note:—

With the approval of the Department suitable Geology courses may be substituted for some of the courses appearing above.

ENGINEERING PHYSICS

Programs in Engineering Physics are provided in order to permit students who show special aptitude for mathematics and physics to obtain a more thorough grounding in these subjects. Graduates in Engineering Physics usually continue to post-graduate study in physics or in certain branches of engineering, or embark on careers in research and development in the many borderline fields where modern physics and engineering overlap. Students may elect to enter one of the following patterns: applied mechanics, nuclear and electronics. A pattern once entered must be continued in the fourth year.

These programs are restricted to students who have completed the work of the first two years with averages of at least 75 percent (or with standings in the upper 10 percent of the class) and first class standing in mathematics and

physics. Applications for admission to a program in Engineering Physics must be made to the Chairman of the Engineering Physics Committee before September 1st of the year in which the student is starting the third year.

For qualified students the details of the program are arranged by the Chairman of the Committee on Engineering Physics in consultation with the Head of the Engineering Department most closely associated with the proposed pattern and with the approval of the Dean.

THIRD YEAR — ENGINEERING PHYSICS

Applied Mechanics, Nuclear and Electronics Patterns

Common Courses: Required in all Patterns

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
C.S. 300	Compiler Language Programming	1	3	0	0
Math. 404	Advanced Calculus	3	0	3	0
	Subtotal Hours—	4	3	3	0

Additional Courses: Applied Mechanics Pattern(1)

F.M. 335	Fluid Mechanics I	2	0	0	0
F.M. 336	Fluid Mechanics II	0	0	2	0
E.M. 355	Advanced Strength of Materials I	0	0	3	0
E.M. 455	Advanced Strength of Materials II	3	0	0	0
E.M. 452	Mechanical Vibrations	0	0	3	0
Mech.E. 301	Mechanical Measurements Laboratory	1	3	1	3
Met.E. 361	Physical Metallurgy	2	3/2	2	3/2
Math. 430	Advanced Mechanics	3	0	3	0
Phys. 482	Electromagnetism	3	0	3	0
	Subtotal Hours—	14	4½	17	4½
	Total Hours—	18	7½	20	4½

Additional Courses: Nuclear Pattern (1)

Ch.E. 361	Unit Operations I	2	3/2	2	3/2
Ch.E. 367	Chem. Eng. Thermodynamics I	0	0	3	1
Math. 430	Advanced Mechanics	3	0	3	0
Phys. 474	Relativity and Wave Mech.	1	0	3	0
Phys. 471	Advanced Laboratory	0	3	0	3
Group A	One Course	3	3/2	3	3/2
	Subtotal Hours—	9	6	14	7
	Total Hours—	13	9	17	7

Additional Courses: Electronics Pattern(1)

E.E. 330	Electrical Machinery	2	3/2	2	3/2
EE. 350	Electrical Circuits	2	3	2	3
E.E. 370	Engineering Electronics	2	3/2	2	3/2
Phys. 474	Relativity and Wave Mechanics	1	0	3	0
Physics 471	Advanced Laboratory	0	3	0	3
Phys. 482	Electromagnetism	3	0	3	0
	Subtotal Hours—	10	9	12	9
	Total Hours—	14	12	15	9

(Optional Courses Applicable As Indicated Above)

Group A

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
E.E. 370	Engineering Electronics	2	3/2	2	3/2
Chem. 470	Physical Chemistry	3	3/2	3	3/2

Note:—

(1) With the approval of the Chairman of the Committee on Engineering Physics and the Dean, suitable courses of equivalent weight may be substituted for certain of the courses listed for the pattern.

FOURTH YEAR — ENGINEERING PHYSICS

Applied Mechanics, Nuclear and Electronic Patterns

Common Courses: Required in all Patterns

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Eng.P. 459	The Practice of the Engineering Profession	0	0	1	0
Math. 500	Theory of Functions of Complex Variables	3	0	3	0
Phys. 550	Mathematical Physics	2	1	2	1
		5	1	6	1

Additional Courses: Applied Mechanics Pattern[1]

C.E. 430	Senior Fluid Mechanics I	3	0	0	0
C.E. 435	Senior Fluid Mechanics II	0	0	3	0
C.E. 571	Indeterminate Structural Analysis	3	0	0	0
C.E. 572	Advanced Structural Analysis	0	0	3	0
Math. 555	Hydro and Aerodynamics	3	0	3	0
Phys. 510	Thermodynamics and Kinetic Theory	3	0	3	0
Group A	Two courses	3	0	3	0
or					
Mech. E. 535, 536	Gas Dynamics				
	Subtotal Hours—	15	0	15	0
	Total Hours—	20	1	21	1

Additional Courses: Nuclear Pattern[1]

Ch.E. 461	Unit Operations II	3	2	3	2
Ch.E. 467	Chem. Eng. Thermo. 11	3	1	0	0
Phys. 482	Electromagnetism	3	0	3	0
Phys. 570	Quantum Mechanics	2	0	2	0
Phys. 572	Nuclear Physics	2	0	2	0
Met.E. 361	Physical Met.	2	3/2	2	3/2
	Subtotal Hours—	15	4½	12	3½
	Total Hours—	20	5½	18	4½

Additional Courses: Electronics Pattern[1]

Number	Subject	Hours per week			
		First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
E.E. 461	Linear System Analysis	3	0	0	0
E.E. 471	Electronic Circuits	3	0	0	0
E.E. 491	Guided Waves	3	0	0	0
Phys. 510	Thermodynamics and Kinetic Theory	3	0	3	0
Group B	Three Courses	0	0	9	0
E.E. 458	Laboratory	0	9	0	9
	Subtotal Hours—	12	9	12	9
	Total Hours—	17	10	18	10

(Optional Courses Applicable As Indicated Above)

Group A

E.M. 551	Theory of Elasticity	3	0	0	0
E.M. 552	Dynamics of Structures	0	0	3	0
E.M. 554	Theory of Elastic Stability	0	0	3	0
E.M. 556	Theory of Plates	3	0	0	0
E.M. 557	Theory of Shells	0	0	3	0

Group B

E.E. 465	Feed Back Systems	0	0	3	0
E.E. 473	Introduction to Transistor Circuits	0	0	3	0
E.E. 475	Generation of High Frequencies	0	0	3	0
E.E. 477	Pulse and Waveshaping Circuits	0	0	3	0
E.E. 479	Switching Circuits and Logical Design	0	0	3	0
E.E. 485	Acoustics	0	0	3	0
E.E. 495	Radiation, Antennas and Propagation	0	0	3	0
E.E. 497	Microwave Measurements	0	0	3	0

Notes:—

(1) With the approval of the Chairman of the Committee on Engineering Physics and the Dean suitable courses of equivalent weight may be substituted for certain of the courses listed for the pattern.

(2) Hours are approximate, depending on the optional courses selected.

DETAILS OF COURSES

GENERAL

Eng.P. 159—L. E. Gads and Guest Speakers (1-0; 1-0)

Orientation to the Engineering Profession—An outline of the development and history of the engineering profession; the branches of engineering; the work of the engineer in the various branches.

Eng.P. 459—R. M. Hardy and Guest Speakers (0-0; 1-0)

The Practice of the Engineering Profession—The role of the engineer in society, his technical and professional responsibilities—ethics of the profession; technical and professional associations; the engineer-in-training; the engineer in industry—technical and administrative work; the consulting engineer.

DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

Chemical Engineering

Ch.E. 252 (0-0; 2-0)

Engineering Materials II—A discussion of the properties of non-metallic materials including natural fibers and resins, synthetic polymers, elastomers and ceramics; the electrical and thermal properties of non-metallics; concrete and wood.
Textbook: Van Vlack, *Elements of Materials Science.*

Ch.E. 361 (2-3/2; 2-3/2)

Unit Operations I—The principles of momentum, heat, and mass transfer. A study of the transfer processes in systems of simple geometry with emphasis on inter-relationships. Topics include the mechanics of viscous and turbulent flow, heat conduction and convection, molecular and eddy diffusion. Applications to chemical engineering are illustrated through selected problems.
Textbooks: Bennett and Myers, *Momentum, Heat, and Mass Transfer;* and Perry, *Chemical Engineers' Handbook.*

Ch.E. 365 (2-1; 0-0)

Industrial Stoichiometry—A study in the application of the laws of conservation of mass and energy to the processes of the chemical industry. Extensive examples are introduced to illustrate units of measurement, material and energy balances without chemical reaction and material and energy balances in processes where chemical reaction is involved.
Textbook: Himmelblau, *Basic Principles and Calculations in Chemical Engineering.*
Corequisites: Chem. 470, Ch.E. 361.

Ch.E. 367 (0-0; 3-1)

Chemical Engineering Thermodynamics I—The application of the first and second laws of thermodynamics to the solution of problems in the field of Chemical and Petroleum Engineering.
Textbook: Van Wylen, *Thermodynamics.*

Ch.E. 461 (3-2. 3-2)

Unit Operations II—The unit operations related to momentum, heat, and mass transfer and the ideal stage concept including fluid flow, heat transfer, evaporation, extraction, distillation, absorption, humidification and drying. Selected design problems are used to illustrate the principles and to point out applications to the process industries.
Textbooks: Perry, *Chemical Engineers' Handbook;* Bennett and Myers, *Momentum, Heat, and Mass Transfer.*
Prerequisite: Ch.E. 361.
Corequisites: Math. 404, Ch.E. 467.

Ch.E. 463 (0-4/2; 0-4/2)

Chemical Engineering Laboratories—A laboratory course designed to illustrate the principal operations of chemical engineering with selected experiments from such fields as unit operations, applied thermodynamics, instrumentation, and applied reaction kinetics.
Corequisite: Ch.E. 461.

Ch.E. 464 (0-0; 3-0)

Applied Reaction Kinetics—The interpretation of the kinetics of homogeneous and heterogeneous chemical reactions leading to the design of chemical reactor and related equipment. The principles are illustrated through the solution of practical problems.
Textbook: Levenspiel, *Chemical Reaction Engineering.*
Corequisites: Ch.E. 461 and Ch.E. 467.

Ch.E. 465 (0-2; 1-4)

Chemical Engineering Project—The application and integration of engineering practices through an assigned project involving a plant design or a chemical engineering research project.
References: Vilbrandt and Dryden, *Chemical Engineering Plant Design;* Rase and Barrow, *Project Engineering of Process Plants.*

Ch.E. 466 (0-0; 3-0)

Control Theory—An introduction to the principles of control theory including feedback concepts, elements of the closed loop, controller functions, controlled system response, and stability concepts.
Textbook: Eckman, *Automatic Process Control*
Corequisite: Ch.E. 476.

Ch.E. 467 (3-1; 0-0)

Chemical Engineering Thermodynamics II—Thermodynamics presented from the engineering viewpoint. Practice is given in the application of thermodynamics as a useful tool in the solution of problems of the process industries and the petroleum production field.
Textbook: Hougen, Watson, Ragatz, *Thermodynamics.*
Prerequisite: Ch.E. 367.

Ch.E. 469 (2-3/2; 0-0)

Economics and Design of Chemical Processes—Process development; plant location factors; estimation of fixed and working capital, manufacturing costs,

and profitability. The solution of selected comprehensive problems dealing with the development of processes and plant design which will require an integrated application of economics and the principles of chemical engineering.
Corequisite: Ch.E. 461.

Ch.E. 472

Colloquium—The colloquium, which meets once a week, is attended by fourth-year students and staff for discussion of topics from recent literature.

Ch.E. 474

Industrial Tour—The third and fourth year classes, accompanied by staff, inspect and study industrial plants, laboratories and field installations in and near Edmonton. Trips are arranged periodically throughout the year.

Ch.E. 476 (3-3/2; 3-3/2)

Process Dynamics—The analysis of processes in the unsteady state to determine transfer functions and the dynamic response characteristics of the process elements. An introduction to analogue simulation and stability analysis of the controlled process.
Textbook: Shilling, *Process Dynamics and Control.*

Ch.E. 477 (3-0; 0-0)

Mathematical Applications—Introduction to complex variables. Fourier expansions and spectral representations of functions. Laplace transformation and applications to ordinary differential and difference equations to solve problems in mechanical and electrical vibrations, and to partial differential equations to solve problems in heat flow.
Textbook: Gustav Doetsch, *Guide to the Application of Laplace Transforms.*

Ch.E. 478 (0-0; 3-3/2)

Statistical Methods in Chemical Engineering—A review of the elementary principles of statistics; the extension and application of statistical methods used by the engineer in analyzing research, development, and production problems.
Textbook: Volk, *Applied Statistics for Engineers.*

Ch.E. 479 (3-3/2; 0-0)

Instrumentation—A study of the basic elements for the measurement and control of process variables; the techniques of instrumenting chemical processes and the response of the controlled process.
Textbook: Eckman, *Automatic Process Control.*

Graduate Courses—

Ch.E. 561 (3-0; 0-0)

Advanced Heat Transfer—Selected topics dealing with heat transfer by conduction and convection with emphasis upon the major analytical developments and experimental practice. Additional topics include the design of packed-exchangers and high-temperature furnaces.
Textbook: Grober, Erk, and Grigull, *Fundamentals of Heat Transfer.*

Ch.E. 562 (0-0; 3-0)

Advanced Mass Transfer Operations—A review of the fundamentals of mass transfer processes and the applications of these fundamentals to the design of various separation processes. Topics to be discussed will include molecular diffusion, diffusion in turbulent flow, interphase mass transfer, absorption, simultaneous heat and mass transfer, absorption with chemical reaction, liquid-liquid extraction, multi-component distillation and absorption and tray efficiencies.

Ch.E. 564 (3-0; 0-0)

Applied Kinetics and Catalysis—Design of homogeneous and heterogeneous reactors for isothermal and non-isothermal operation. Correlation of rate data, selectivity, non-ideal flow, heterogeneous catalysis, transport processes ln heterogeneous reactors and polymer kinetics.
Textbook: Levenspiel, *Chemical Reaction Engineering.*

Ch.E. 566 (3-0; 0-0)

Process Control—An analysis of non-linear and sampled data control systems with an introduction to computer control and optimization.
Textbook: Eckman, *Automatic Process Control.*
References: Recent technical literature.

Ch.E. 567 (3-0; 0-0)

Advanced Thermodynamics—Advanced applications of thermodynamics to industrial problems; the estimation of thermodynamic properties, feasibility of chemical reactions and other selected topics.
References: Recent technical literature.

Ch.E. 568 (3-0; 0-0)

Selected Topics in Fluid Mechanics—Basic equations of fluid mechanics and their application to flow problems in chemical engineering. Discussion of Non-Newtonian fluids, multi-phase flows, Stokes' law, perfect theory, boundary layer theory, and modern concepts of turbulence.
References: Schlichting, *Boundary Layer Theory;* Bird, Stewart, Lightfoot, *Transport Phenomena.*

Ch.E. 572 (1-0; 1-0)

Graduate Seminar—Meetings of graduate students and staff are held periodically throughout the year for discussion of progress and problems in research underway in the Department.

Ch.E. 577 (3-0; 0-0)

Mathematical Applications—The lectures of Ch.E. 477 with additional assignments for graduate students.

Ch.E. 578 (0-0; 3-0)

Advanced Mathematical Applications II—Application of mathematics to engineering problems with emphasis on implicit function theory, least square techniques, and vector and tensor analysis. Problems in thermodynamics, curve fitting, hydrodynamics, behavior of materials.
Text: To be announced.

Ch.E. 595 (0-0; 3-0)

Advanced Topics in Chemical Engineering—An advanced treatment of selected chemical engineering topics of current interest to staff and students.

Petroleum Engineering

Pet.E. 482 (3-3/2; 0-0)

Reservoir Mechanics I—A fundamental treatment of the reservoir rock properties, fluid properties, phase behavior of reservoir fluids and the basis concepts of fluid flow in porous media.
Textbook: Pirson, *Elements of Reservoir Engineering.*

Pet.E. 483 (0-0; 3-3/2)

Reservoir Mechanics II—The application of the physical principles of reservoir mechanics to reservoir engineering. The analysis of reservoir performance.
Textbook: Craft and Hawkins, *Applied Petroleum Reservoir Engineering.*

Pet.E. 580 (0-0; 3-0)

Physical Properties and Behavior of Petroleum Fluids—An advanced treatment of the phase behavior of single and multicomponent hydrocarbon and hydrocarbon—non-hydrocarbon systems; hydrocarbon—water systems and hydrate formation; the prediction of critical properties, volumetric behavior, and the transport properties; vapor-liquid equilibrium and the prediction of equilibrium ratios.
References: Sage and Lacey, *Volumetric and Phase Behavior of Hydrocarbons;* Recent technical literature.

Pet.E. 583 (3-0; 0-0)

The Mechanics of Fluid Flow in Porous Media—An advanced treatment of the physical properties of porous media, with special attention to single-phase and multi-phase fluid flow.
Textbook: Scheidegger, *The Physics of Flow through Porous Media.*

Pet.E. 584 (0-0; 3-0)

Secondary Recovery—An advanced study of partial pressure maintenance and full pressure maintenance utilizing the fractional flow equation and frontal advance rate equation.
Textbook: A.P.I., *Secondary Recovery of Oil in the United States.*

Pet.E. 585 (3-0; 0-0)

Fluid Mechanics of Natural Gas Production—Static columns; steady, single and multiphase flow in circular conduits; steady and transient single phase flow in porous media; well and field interference.

Pet.E. 592 (1-0; 1-0)

Graduate Seminar—Course description as for Ch.E. 572.

Pet.E. 595 (0-0; 3-0)

Advanced Topics in Petroleum Engineering—An advanced treatment of selected petroleum engineering topics of current interest to staff and students.

Research

Facilities are available for graduate research in fundamental problems in both chemical and petroleum engineering. Particulars may be obtained from the

Department and by reference to the Calendar of the Faculty of Graduate Studies.

DEPARTMENT OF CIVIL ENGINEERING

C.E. 153 (0-0;1-0 + 3½ weeks at end of 2nd term)

Surveying—The theory and practice of plane and topographic surveying, including construction, use and care of instruments; computation of areas; methods of topographic surveying; route surveys, including curve and earthwork problems, land-survey systems.

Lectures continue daily during the survey school period.

Field work includes chaining, rodding, levelling, transit work, plane table survey, plotting of field notes.

C.E. 262 (2-4/2; 2-4/2)

Strength of Materials—Normal stress and normal strain; shearing stress and shearing strain; Mohr's circle for stress; temperature stresses; stresses in beams; beam deflections; statically indeterminate beams; torsion; combined stresses; columns.

Laboratory exercises to illustrate the physical properties of materials, including the testing of ordinary engineering materials in tension, compression, bending, twisting, hardness and impact.

C.E. 333 (2-3/2; 2-3/2)

Fluid Mechanics—Fundamental principles of fluid mechanics.

Laboratory exercises in hydraulics, including experiments on small orifices, weirs and notches, flow through pipes, impact of jets, and tests of hydraulic machines, etc.

C.E. 334 (3-3/2; 0-0)

Fluid Mechanics—Basic equations and their application to statics, one-dimensional incompressible flow, two dimensional irrotational flow in the form of the Laplace equation, and to selected viscous flow problems. Turbulent flow in pipes. Introduction to compressible flow. Dimensional analysis. Laboratory periods devotde to the solution of problems.

C.E. 335 (2-0; 2-0)

Fluid Mechanics—Fundamental principles of fluid mechanics for students in Engineering Physics.

F.M. 335 (2-0; 0-0)

Fluid Mechanics—Basic equations and their application to statics, one-dimensional incompressible flow, and two dimensional irrotational flow using the Laplace equation. Pressure waves in fluids. Laboratory experiments.

C.E. 340 (0-0; 2-0)

Elements of Soil Mechanics—Fundamental principles of soil mechanics including origin, classification and structure of soils; soil moisture, capillarity and permeability; simple soil tests and classification tests; subsurface investigations and strength theory.

C.E. 350 (2-3/2; 2-3/2)

Geodesy and Photogrammetry—Shape of the earth and geodetic methods; field astronomy; cartography; photogrammetry and photo interpretation and analysis; newer survey instruments. Laboratory to include geodetic computations, astro observations for position and azimuth, map projections, photo interpretations; demonstration of photogrammetric equipment and tellurometer.

C.E. 360 (2-0; 2-0)

Theory of Structures—Statically determinate structures, influence lines, stress analysis under static and moving loads, deflections by analytical and graphical methods. Introduction to statically indeterminate structures; computations for slopes and deflections and application to consistent deformation; moment distribution for continuous beams.

C.E. 362 (2-3; 2-3)

Structural Design—Codes and specifications. Theory and design of steel structures for riveted, bolted and welded fabrication; plate girders; trusses. Theory and design of timber structures including glued laminated members and timber connections. Design problems including detailing and preparation of working drawings, are carried out in the laboratory.

C.E. 380 (3-0; 3-0)

Engineering Applications of Differential Equations and Statistics—Review of basic engineering principles, ordinary differential equations, Laplace transforms, power and Fourier series. Partial differential equations, statistics, introduction to complex variables and vector analysis. The above content is presented with numerous examples and applications to engineering problems in such a way as to show that differential equations and mathematical formulations are applicable in all fields.
References: Pipes, *Applied Mathematics for Engineers and Physicists* (McGraw-Hill); Pierce, *A Short Table of Integrals* (Ginn and Co.); Reddick and Miller, *Advanced Mathematics for Engineers* (Wiley); Salvodari and Schwartz, *Differential Equations in Engineering Problems* (Prentice Hall).
Prerequisite: Math. 303.

C.E. 410 (2-3/2; 2-3/2)

Highway Engineering—Early roads, traffic planning, highway economics, geometric design; drainage, earthwork, compaction; soil stabilization, frost action, design of bituminous mixes and properties of bituminous materials.

C.E. 411 (2-0; 2-0)

Highway Engineering—Early roads, traffic planning, highway economics, geometric design; drainage, earthwork, compaction; soil stabilization, frost action, design of sub-base, base course and pavement both flexible and rigid; design of bituminous mixes and properties of bituminous materials.

C.E. 420 (2-3/2; 2-3/2)

Water Supply and Sewerage—Quantity, quality and pressure requirements; collection and intake works, water purification and treatment, design of water treatment plants, design and hydraulics of distribution systems. Separate and

combined sewers, storm drains, pipe layout, estimates; methods of sewage treatment and plant design.

C.E. 422 (1-3; 0-0)

Sanitary Engineering Laboratory—A laboratory course to include tests on water and sewage, common control tests for water and sewage treatment, use of instruments and interpretation of results.

C.E. 425 (0-0; 3-0)

Municipal Engineering—Lectures covering fundamentals of topics related to municipal engineering including administration, economics, surveys, records, utilities, land use and subdivision design, street geometrics and traffic control, air pollution, and municipal master plan.

C.E. 430 (3-0; 0-0)

Senior Fluid Mechanics I—Describes the properties and kinetics of real fluids and derives, from essentially physical arguments, the various forms for the equations of continuity, momentum, angular momentum and energy for steady and unsteady (including turbulent steady) flow. Dimensional analysis. Friction factors and velocity distributions in uniform circular pipes. Applications of theory include surge and waterhammer, fans turbines and pumps, and the parallel development of open channel flow with gas dynamics for problems of varying section and shock waves. Stress is laid on graphical methods.

C.E. 431 (0-3/2; 0-3/2)

Senior Hydraulics Laboratory—Choice from among a variety of experiments and related problems aimed mainly at demonstrating the behaviour of real fluids in engineering situations; model use and interpretation is included. Facilities are available for studying fundamental fluid behaviour.

C.E. 434 (0-0; 3-3)

Water Power Engineering—Use of water; principles of designing hydroelectric installations; principles of designing and testing of pumps and turbines; graphics of water hammer and surge; accessory equipment; economics; design and use of fans.

C.E. 435 (0-0; 3-0)

Senior Fluid Mechanics II—C.E. 430 is recapitulated and extended with the aid of classic hydrodynamic methods to include potential flow, stream functions, vorticity, Stokes theorem, waves, rotating axes, stress representation, Navier Stokes equation, turbulence and boundary layers.

C.E. 436 (0-0; 3-3)

Hydrology and River Engineering—The cycle of water occurrence in nature and its relation to hydraulic engineering. Frequency analysis, unitgraph methods, flood routing and other studies of hydrologic data. River behaviour, theory, man's interference with rivers, river control structures, river training works, sediment transport.

C.E. 440 (2-0; 2-0)

Foundations and Earth Structures—Distribution of pressure under founda-

tions, soil exploration methods and field tests, proportioning footings, pile foundations, landslides, earth pressures, theory of consolidation, earth dams, seepage.

C.E. 441 (0-3; 0-3)

Soil Mechanics Laboratory—Laboratory testing to determine the engineering properties of soil; problems in the application of test results to the design of highways, airport runways, earth dams and building foundations.

C.E. 455 (2-2; 0-0)

Concrete Technology—Properties of cement, aggregate, water and admixtures; properties of fresh and hardened concrete; proportioning of mixes; manufacture, placing and curing; inspection and testing; analysis and interpretation of test data; specification requirements.

C.E. 459 (no designated time)

Practical Experience or Project Assignment—Requirements for this course may be met one of three ways:—

(a) The student may find suitable employment and gain practical experience in Civil Engineering for a period of at least one summer vacation after completion of second year and before entering fourth year. A draft "Report on Practical Experience" must be prepared and submitted not later than December 1 of the fourth year. The final report must be submitted by February 15th.

or—

(b) Students finding difficulty in securing suitable employment are required to inform the Department not later than May 15 of the summer preceding registration for fourth year, at which time a library project may be assigned. A draft report on this work must be submitted not later than December 1 of the fourth year. The final report must be submitted by February 15th.

or—

(c) In certain special cases students of good academic standing may be permitted to carry out a research project in the fourth year under the direction of a staff member.

C.E. 460 (2-0; 0-0)

Theory of Structures—Statically indeterminate structures; analysis of continuous girders and frames using method of work, moment distribution, slope deflection, and column analogy. Anlaysis of bents for sidesway.

C.E. 462 (3-0; 0-0)

Advanced Strength of Materials—Shear centers, unsymmetrical bending, curved beams, deep beams, inelastic bending. Elastic and inelastic buckling of columns, buckling of flat plates. Lateral buckling of beams. Torsion of beams. Bending of plates.

C.E. 463 (3-3; 0-0)

Reinforced Concrete Design—Working stress design theory. One-way slabs, beams and girders. Centrically loaded tied columns and spirally reinforced columns. Eccentrically loaded columns. Footings. Two-way slabs and flat slabs. Introduction to ultimate strength design theory.

C.E. 464 (0-0; 2-3)

Reinforced Concrete Design II—Ultimate strength design theory. Deflections. Haunched beams, rigid frames and arches. Prestressed concrete design including principles of linear pre-stressing and design of simple span beams.

C.E. 466 (0-0; 3-0)

Numerical and Approximate Methods of Structural Analysis—Methods of successive approximations and numerical procedures for the solution of: moments and deflections of beams, beam columns and frames; influence coefficients and influence lines for beams; buckling strength of columns; beam columns; beams on elastic foundations; free vibrations of beams.

Graduate Courses

C.E. 510 (3-0; 0-0)

Pavement Design—Theories and principles of flexible and rigid pavement design and construction control. Pavement performance and evaluation.

C.E. 511 (0-0; 2-2)

Highway Materials—Source, manufacture, properties, tests and specifications of bituminous materials. Properties and testing of aggregates, bituminous and other stabilized mixtures. Current research developments.

C.E. 512 (3-0; 0-0)

Transportation Engineering I—Introduction to all modes of transportation, characteristics of vehicles, road users, traffic flow, speed, etc. Geometric design of highways, intersections and interchanges.

C.E. 513 (0-0; 3-0)

Transportation Engineering II—Traffic engineering and control. Parking studies and design, mathematical transportation models. Seminars on transportation, traffic and design problems.

C.E. 520 (3-0; 3-0)

Sanitary Engineering—Hydraulic analysis of networks, detailed theory and design of processes for water treatment and waste disposal for municipalities and industry. Water pollution indices, stream classification. Air pollution evaluation, sources, methods of control, relation of atmospheric conditions to their dispersal.

C.E. 522 (0-0; 2-4)

Water and Waste Treatment—Theoretical and analytical methods for the chemical, biochemical, and biological examination of water and wastes, with emphasis on their interpretation and significance.

C.E. 530 (3-0; 3-0)

Advanced Fluid Mechanics—Hydrostatics. Potential fields and their flow lines. Flow nets. Vorticity. Continuity equation. Differentiation with respect to time. Frictionless equations of motion and of energy. Physical aspect of energy equation and its practical extensions to friction, turbulence and mean velocity in a section. Rotating axes. Unsteady analysis. Friction factor in uni-

form pipes. Equation of motion with friction; stress representation; Navier-Stokes equation. Turbulence. Velocity distribution in uniform pipes and relation to flow formulas. Boundary layers.

C.E. 531 (3-0; 0-0)

Engineering Aspects of Ground Water Hydrology—Darcy's Law. Permeability. Equations for flow of a compressible liquid through compressible porous media under unsteady conditions. Equilibrium and non-equilibrium well pumping equations. Well testing. Waterlogging. Other selected topics.

C.E. 532 (0-0; 3-0)

Surface Water Hydrology—Precipitation. Snow and snow melt. Stream gaging. Unit hydrograph theory. Evaporation. Channel and reservoir routing. Base flow. Statistical analysis. Other selected topics.

C.E. 533 (3-0; 0-0)

River Engineering I—Equilibrium behaviour of self-formed rivers, concept of regime, elementary laws of self-adjustment, practical application of laws to river problems such as bank undercutting, scour around piers, dykes, assisted cutoffs, diversions.

C.E. 534 (0-0; 3-0)

River Engineering II—Dynamical development of basic regime laws, river models, sediment exclusion and ejection, case histories.

C.E. 535 (3-0; 0-0)

Open Channel Flow I—Euler's equations, continuity equation, conjugate depths and location of the hydraulic jump for rectangular and non-rectangular sections. Energy of flow, critical conditions, gradually varied flow.

C.E. 536 (0-0;3-0)

Open Channel Flow II—Wave celerity, oscillatory wave, wave routing by analytical and graphical means, for friction, bedslope and changes in cross section. Surge waves.

C.E. 539 (2-2; 0-0)

Hydraulics of Earth Dams and Related Structures—Hydrology, analysis of reservoirs, ground water flow, spillways, cofferdams, ice problems, diversion works; application to design of earth and rock-fill dams and embankments.

C.E. 540 (3-0; 3-0)

Soil Mechanics and Foundations—Theories of plastic and elastic equilibrium arching, stress-deformation, shear strength, consolidation, earth pressure; application of the theory and principles to selection and design of foundations, retaining structures, anchored bulkheads, cofferdams, tunnels, culverts, bracing of open cuts.

C.E. 541 (2-3; 2-3)

Soil Properties—Subsurface exploration, physico-chemical aspects, index and control tests, stress-deformation and consolidation characteristics and tests, hydraulic properties. Character of natural deposits.

C.E. 542 (0-0; 3-0)

Advanced Soil Mechanics Problems—A case history method of approach to problems involving the application of the principles of soil mechanics in engineering practice, including the design and analysis of foundations, settlement, stability of slopes, earth dams and embankments, retaining walls, drainage and flow of water through soils.

C.E. 543 (3-0; 3-0)

Soil Mechanics and Foundations—(Designed primarily for students majoring in the field of Structures.)
Theories of consolidation, stress-deformation and shear strength characteristics, plastic equilibrium, earth pressures, stress distribution; character of natural deposits; the application of the theories and principles to the selection and design of foundations, buried structures and retaining walls.

C.E. 544 (0-0; 3-0)

Earth and Rock-Fill Dams—Stability of slopes, seepage control, earthquake considerations, settlement, mechanism of failures, character of natural deposits, instrumentation, site selection; application to design and construction of earth and rock-fill dams and embankments.

C.E. 555 (3-0; 0-0)

Cement and Concrete Technology—Theories of cement hydration, aggregate properties, properties of plastic and hardened concrete, freezing and thawing, cement-aggregate reactions, pozzolans, admixtures, significance and interpretation of tests.

C.E. 561 (0-0; 3-0)

Plastic Analysis and Design of Structures—Basic assumptions and hypotheses. Limit analysis of beams and frames. Determination of deflections in plastic beams and frames. Repeated loading and shakedown. Plastic analysis of members under combined stress.

C.E. 562 (3-0; 0-0)

Behaviour and Design of Steel Structures—Structural research and theory and their relationship to current specifications and design procedures. Riveted, bolted and welded connections; columns; flexural members; frames. High strength steels. Light gauge construction.

C.E. 563 (3-0; 0-0)

Behaviour and Design of Reinforced Concrete Members—Strengths and behaviour of simple reinforced concrete members. Relation between results of research and current design specifications. Members subjected to flexure, axial compression, combined flexure and axial load, combined flexure and shear, torsion.

C.E. 564 (0-0; 3-0)

Behaviour and Design of Reinforced Concrete Structures—Strength and behaviour of intermediate reinforced concrete structures. Load factors. Elastic and limit analysis of continuous beams and frames. Behaviour and design of floor slabs and footings. Stability of reinforced columns, beams and frames.

C.E. 565 (0-0; 3-0)

Behaviour and Design of Prestressed Concrete Structures—Elastic analysis, design and behaviour of simply supported and continuous prestressed concrete beams, frames and slabs. Methods of prestressing; prestress losses; anchorage zone stresses. Discussion of current design specifications.

C.E. 571 3-0; 0-0)

Indeterminate Structural Analysis—A study of determinacy and stability criteria. Developments of classical methods for determining the deformations of statically determinate structures and the analysis of statically indeterminate structures, with emphasis on the similarities, differences and restrictions of these methods. Application of these methods to indeterminate trusses, multi-storey frames, Vierendeel trusses, gable frames, etc.

C.E. 572 (0-0; 3-0)

Advanced Structural Analysis—Analysis of multi-storey, multi-panel building frames. Effects of axial loads on methods of analysis; stability of frames; secondary stresses in trusses; analysis and stability using matrixes, beam-columns; finite difference equations, use of mathematical analogues in analysis.

C.E. 573 (3-0; 0-0)

Analysis and Design of Roof Shells—A consideration of the assumptions made and limitations of existing shell theories. An examination of the literature for recommendations and modifications of theory when required. Emphasis placed on design of the following shell types, folded plates; shells of revolution, domes, cylindrical vaults; shells of double curvature, hyperbolic paraboloids, elliptic paraboloids.

Drafting and Graphics 151 (0-3; 2-4)

Freehand tracing, sketching and instrumental drawing; reproduction of drawings, orthographic projection; fundamental views; elementary problems; surfaces and solids.

DEPARTMENT OF ELECTRICAL ENGINEERING

E.E. 252 (2-3/2; 2-3/2)

Electrical Circuits—Circuit elements—Analogies between electrical and mechanical networks—Ohm's and Kirchoff's laws—Natural, forced, and transient behaviors of networks—Equivalent circuits—Thevenin's and Norton's theorems—Node and loop methods of analysis—series and parallel resonance—Active and reactive power. Coupled Circuits and transformers.

E.E. 301 (0-0; 2-3/2)

Elements of Electrical Engineering—Polyphase A.C. circuits, power transmission and distribution transformers, A.C. and D.C. motors, principles of operation, characteristics, electronic instrumentation; control systems.

E.E. 302 (3-3/2; 3-3/2)

Elements of Electrical Engineering—Polyphase theory and application; magnetic theory and applications; transient conditions and complex frequency plane; small motors; generators and other small devices; instruments and instrumentation; control systems.

E.E. 303 (2-2/3; 0-0)

Electronic Instrumentation (For Chemical Engineers)—Fundamentals of Electronics; amplification, oscillation, modulation applied to measuring instruments; methods of measuring non-electrical quantities. Use of measured quantities in control systems. The laboratory will illustrate the uses and limitations of typical instruments.

E.E. 312 (3-3/2; 3-0)

Fundamentals of Electrical Engineering—Vector treatment of electric and magnetic fields and applications, properties of magnetic materials, dielectrics, Maxwell's equations, electromagnetic waves in homogeneous isotropic media, boundary conditions, reflection and refraction of plane waves, spherical waves, radiation. Atomic structure, Properties of semiconductors—photoelectric, Hall and thermoelectric effects and applications. Gaseous conduction.

E.E. 330 (2-3/2; 2-3/2)

Electrical Machinery—3 phase circuite, a study of power transformers, synchronous generators and motors, induction motors.

E.E. 350 (2-3/2; 2-3)

Electrical Circuits II—Linear and non-linear network elements; Fourier series; Fourier transform; Laplace transform; Complex frequency plane; Impedance and admittance functions; Two-port networks and network functions; Distortion; Attenuation and filters; Active Circuits.

E.E. 370 (2-3/2; 2-3/2)

Engineering Electronics—Motion of charged particles in electric and magnetic fields; vacuum and semiconductor diode characteristics; photoelectric devices; vacuum triodes and equivalent circuits; transistors and equivalent circuits; multi-electrode tubes; gas tubes; untuned voltage and power amplifiers; amplitude modulation.

E.E. 401 (3-0; 0-0)

Electrical Design—Electrical Design starting from fundamental physics using engineering methods.

E.E. 407 (0-0; 3-0)

High Voltage Engineering—High Voltage Phenomena on Transmission Lines, Dielectric Phenomena, A.C. Testing, Impulse Testing and Rating, Grounding, Circuit Breaking.

E.E. 421 (3-0; 0-0)

Electrical Power Transmission—Transmission Circuit Constants. G. M. D. Methods, AC Power Transmission and Power Diagrams, Line compensation, Fault Conditions with Asymmetry, DC Transmission.

E.E. 425 (0-0; 3-0)

Power System Planning—The Power system, Planning, Continuity of Supply, Operation, Economics, The System Analyser and its operation. Other methods of system analysis.

E.E. 431 (3-0; 0-0)

Electrical Machinery II—Electrical machinery: D.C. Machines, Power rectifying equipment, A.C. commutator machines and a more detailed study of selected topics from E.E. 330.

E.E. 445 (0-0; 3-0)

Electrical Instruments and Relays—A study of modern A.C. instruments, relays, and relaying.

E.E. 461 (3-0; 0-0)

Linear System Analysis—Linear models, response to impulse and step functions, convolution integral, transfer functions, block diagrams, signal flow diagrams, geometry of transfer functions in the s-plane; root locus diagrams, frequency response, stability considerations.

E.E. 465 (0-0; 3-0)

Feedback Systems—Transfer functions of basic elements, system characteristics, stability considerations of closed loop systems, cascade and feedback compensation, multiple loop systems, optimum response, carrier systems, introduction to nonlinear systems.

E.E. 471 (3-0; 0-0)

Electronic Circuits—Voltage amplifiers; power amplifiers A.F. and R.F.; Class A. B and C; modulation and demodulation AM, FM and PM; Complete transmitter and receiver circuits.

E.E. 473 (0-0; 3-0)

Introduction to Transistor Circuits—Semiconductor Physics, Transistor As Circuit Elements, Equivalent Circuits, DC Biasing and Stability, Transistor Amplifiers.

E.E. 475 (0-0; 3-0)

Generation of High Frequencies—Triodes at high frequencies, Klystrons, Travelling wave tubes, Magnetrons, Backward wave oscillators, parametric amplifiers, and masers.

E.E. 477 (0-0; 3-0)

Pulse and Waveshaping Circuits—Waveshaping circuits using passive elements, diodes, active devices; pulse generating circuits, mainly multivibrators and blocking oscillators; generation of linear voltage sweeps; other topics such as counting circuits, gating circuits, applications to computers, etc.

E.E. 479 (0-0; 3-0)

Switching Circuits and Logical Design—The development and interpretation of switching circuit algebra and its application in analysis and synthesis of combinational switching circuits; Procedures for minimization of switching circuits and realization of switching functions using relays, tubes, solid state devices and magnetic components. Types of codes and code conversion. Sequential switching circuits and secondary assignment method.

E.E. 487 (0-0; 3-0)

Communication Theory—This covers the principles of communication theory

for students interested in communication and in the presentation of data to modern signalling systems.

E.E. 491 (3-0; 0-0)

Guided Waves—Electromagnetic and Nonelectromagnetic Traveling and standing waves, transmission lines, impedance charts and matching, plane waves, waveguides, cavity resonators, applications.

E.E. 495 (0-0; 3-0)

Radiation, Antennas and Propagation—Radiation, Antennas, Antenna Arrays, Antenna Practice, Aperture Antennas, Ground Wave Propagation, Sky Wave Propagation.

E.E. 497 (0-0; 3-0)

Microwave Measurements—Theory and techniques for the measurement of wavelength and frequency, impedance, attenuation, Q-factor, power receiver, transmitter and aerial characteristics, properties of materials.

Graduate Courses—

E.E. 521 (2-6; 2-6)

Electric Circuits—The theory and methods for the analysis of modern power system problems with system studies on the Network Analyzer.

E.E. 550 (3-0; 3-0)

Network Analysis and Synthesis—Fundamentals of network theory including applications of matrix theory, integral transforms and network topology. A study of methods for the synthesis of networks for prescribed driving-point or transfer characteristics.

E.E. 561 (2-3; 2-3)

Nonlinear Control Systems—Analytical methods; quasi linearisation; describing functions (sinusoidal and random input), phase plane method; relay servomechanisms, stability criteria, compensation techniques, analog simulation.

E.E. 562 (2-3; 2-3)

Sampled-Data Control Systems—Sampling and quantizing; frequency domain analysis, z-transformation; system analysis, transient behaviour and stability, compensation techniques, synthesis, digital compensation.

E.E. 591 (2-6; 2-6)

Electromagnetic Engineering—Fundamental Electromagnetic Theory with applications to transmission lines, wave guides and antennas.

E.E. 592 (3-0; 3-0)

Waves in Plasma—Basic equations and laws, classification of waves and plasmas, transverse, longitudinal and magneto-hydrodynamic waves, coupling of plasmas and radiation.

DEPARTMENT OF MECHANICAL ENGINEERING

E.M. 150 (3-3/2; 0-0)

Engineering Mechanics (Statics)—Fundamental principles of statics and their applications; stresses in simple frames; friction; centers of gravity; moments of inertia of plane areas. The laboratory periods will be devoted to the solution of selected problems by graphical and analytical methods.
Textbooks: to be selected.

E.M. 151 (0-0; 3-0)

Engineering Mechanics (Particle Dynamics)—The fundamental principles of mechanics applied to particles, kinematics, principles of kinetics, rectilinear translation, curvilinear translation; work and energy, impulse and momentum.

E.M. 251 (2-0; 2-0)

Engineering Mechanics—Dynamics—Review of fundamental principles; moments of inertia and products of inertia of plane figures and material bodies; kinematics and kinetics of rigid body motion; work and energy; impulse and momentum; periodic motion.
Textbook: To be selected.

E.M. 355 (0-0; 3-0)

Advanced Strength of Materials I—A review of the simple beam theory and its extension to unsymmetrical bending, curved beams, hooks and rings; deflections; shear flow and shear center; energy methods; statically indeterminate problems; temperature effects.
Textbooks: Seely and Smith, *Advanced Mechanics of Materials* (Wiley).

E.M. 452 (0-0; 3-0)

Mechanical Vibrations—The behaviour of the lumped system of one and two degrees of freedom, together with discussion of vibration measuring instruments, vibration absorbers, vibration isolation, lumped systems of several degrees of freedom, vibration of beams, electrical equivalence of mechanical systems.
Textbook: To be selected.
Prerequisites: E.M. 251, Math. 407 or equivalent.

E.M. 453 (3-0; 0-0)

Mechanical Vibrations (For Electrical Engineers)—As E.M. 452.
Textbook: To be selected.

E.M. 455 (3-0; 0-0)

Advanced Strength of Materials II—A continuation of E.M. 355 to include composite thin wall cylinders, thick cylinders, shrink fits; theories of failure and their application to design problems; torsion solid and open sections; stability; simple shells and membranes; temperature stresses.
References: Seely and Smith, *Advanced Mechanics of Materials* (Wiley); Brownell and Young, *Process Equipment Design* (Wiley).

E.M. 460 (0-0; 3-0)

Mechanics of Solids—Review of basic concepts in stress and strain energy

principles, temperature stresses, stress concentration, impact loading, fatigue, creep, yield criteria, contact stresses, hardness, viscous flow, lubrication.
Textbook: Long, *Mechanics of Solids and Fluids* (Prentice Hall).
Prerequisite: Math. 480.

F.M. 336 (0-0; 2-0)

Fluid Mechanics II—The relation of the laws of thermodynamics and mechanics to fluid flow stressing the analysis from a "system" and "control volume" point of view. Study of the various regimes of flow using dimensional analysis and Navier-Stokes equations. Introduction to compressible flow.
Textbook: Shames, *Mechanics of Fluids* (McGraw-Hill).

Mech.E. 301 (1-3; 1-3)

Mechanical Measurments Laboratory—Characterization and behaviour of typical measuring systems, emphasizing wherever necessary the limitations of such measurements. Transducers, amplifiers, readout devices and their response to steady and transient phenomena are considered. Selected laboratories, experiments in heat transfer, fluid flow, thermodynamics, vibrations and strength of materials are used to illustrate the various measuring techniques.
Textbook: To be selected.

Mech.E. 340 (2-0; 2-0)

Thermodynamics I (For Mechanical Students)—Review of fundamental concepts; a detailed study of entropy, availability, mixtures of non reactive gases, reactive mixtures, the equilibrium constant, kinetic theory and their application to engineering problems.
Textbook: To be selected.

Mech.E. 342 (0-0; 3-0)

Applied Thermodynamics and Heat Transfer (For Electrical Students)—Review and extension of fundamental concepts: psychrometric principles. Entropy and information theory. Energy conversion with particular reference to electrothermal devices. Fundamentals of heat transfer: conduction, convection and radiation problems in electrical engineering.
Textbook: To be selected.

Mech.E. 343 (0-0; 3-0)

Applied Thermodynamics and Heat Transfer (For Civil Students)—Review of fundamental concepts, air compressors, air engines, gas power cycles, vapor power cycles, refrigeration, psychrometric principles, Fourier's Law, Stefan-Boltzmann equation, steady state heat conduction, free and forced convection, radiation heat transfer.
Textbook: To be selected.

Mech.E. 360 (2-3/2; 2-3/2)

Mechanics of Mechines—An introduction to the kinetics and dynamics of machines; theoretical design of clutches, brakes, belt drives, gears, shafting, etc.; balancing, critical speeds.
Textbook: To be selected.

Mech.E. 401 (0-3; 0-3)

Mechanical Engineering Laboratory—Selected laboratory experiments covering material presented in applied thermodynamics, heat transfer, gas dynamics and engineering mechanics.

Mech.E. 405 (0-0; 3-0)

Power Plant Engineering—The economics, design and equipment of modern power stations and systems.
References: Morse, *Power Plant Engineering;* Gerhardt, *Steam Power Plant Engineering;* Skrotski and Vopat, *Applied Energy Conversion.*
Prerequisite: Mech.E. 340, or Mech.E. 342.

Mech.E. 421 (3-0; 0-0)

Applied Thermodynamics—Thermodynamic analysis of cycles and propulsion systems applicable to engines, steam and gas turbines, elementary rockets, and refrigeration equipment. Principles of combustion. Heat balance problems.
Textbook: To be selected.

Mech.E. 436 (0-0; 3-0)

Applied Gas Dynamics—A study of two dimensional inviscid flow; Joukowski transformation; aerofoils. One dimensional compressible flow, subsonic and supersonic flow in ducts; shock waves. Two dimensional viscous compressible flow; laminar and turbulent boundary layers; separation. Analysis of blades and impellers.
Textbook: To be selected.

Mech.E. 440 (3-0; 0-0)

Thermodynamics II—Extension of macroscopic techniques; Maxwell's relations between properties. Introduction to microscopic analysis; statistical thermodynamics with applications to solid and gaseous phases. Entropy and the third law of thermodynamics. Change of phase; first and second order changes; metastability.
Textbook: Lee, Sears, Turcotte, *Statistical Thermodynamics,* Addison Wesley.

Mech.E. 462 (2-3/2; 0-3)

Principles of Design—Application of the principles of mechanics and physical properties of materials to the design of machine elements. Selected projects requiring the student to exercise his creative ability, to make assumptions and decisions and in general, to devise new designs rather than analyze existing ones.
Textbook: To be selected.

Mech.E. 470 (3-0; 0-0)

Heat Transfer I—Fundamental steady state heat transfer principles: conduction, free and forced convection, radiation. Combined effects of conduction, convection and radiation. Dimensional analysis. Heat transfer in the unsteady state. Analogies. Numerical and graphical methods. Computer applications.
Textbook: To be selected.
Prerequisite: Mech.E. 340, Math. 407.

Mech.E. 471 (0-0; 3-0)

Heat Transfer II—Selected topics in conductive, radiative, and convective heat transfer.
Textbook: To be selected.
Prerequisite: Mech.E. 470.

Graduate Courses—

E.M. 551 (3-0; 0-0)

Theory of Elasticity—Fundamental concepts of elastic theory. Equation of stress equilibrium and strain compatibility. Solution of two dimensional problems. Analysis of stress and strain in theree dimensions. Solution of torsion problems.
Textbook: Timoshenko and Goodier, *Theory of Elasticity.*
Selected references.

E.M. 552 (0-0; 3-0)

Dynamics of Structures—Behaviour of elastic structures subjected to dynamic loads. Vibrations of buildings and bridges excited by machinery, earthquakes and wind, traffic.
Selected references.

E.M. 554 (0-0;3-0)

Theory of Elastic Stability—Stability analysis of bars under separate or combined axial, lateral, torsional loading, by solution of differential equations, energy approximations. Buckling of rectangular plates.
Textbook: Timoshenko and Gere, *Theory of Elastic Stability.*
Selected references.

E.M. 555 (3-0; 3-0)

Theory of Plasticity—Basic laws of stress and strain. Theories of strength. Plastic stress-strain relations. Problems in plastic flow of ideally plastic materials. Problems in plastic flow of strain-hardening materials. Applications to metal forming processes.
Textbook: Hill, *Mathematical Theory of Plasticity* (O.U.P.)

E.M. 556 (3-0; 0-0)

Theory of Plates—The plate equation in rectangular and polar coordinates. Solution of the plate equation for rectangular and circular plates under various loads. Special plate problems.
Textbook: Timoshenko and Woinowsky-Krieger, *The Theory of Plates and Shells* (McGraw-Hill).

E.M. 557 (0-0; 3-0)

Theory of Shells—Membrane theory of shells of revolution subjected to uniform and non-uniform loadings. Introduction to the bending theory of shells.
Textbook: Timoshenko and Woinowsky-Krieger, *The Theory of Plates and Shells* (McGraw-Hill).

E.M. 600-604 Max. of 6 hrs. credit in any project

Reading Projects in Engineering Mechanics—With permission of the depart-

ment, projects may be selected from the following areas, E.M. 600 Elasticity; E.M. 601 Plasticity; E.M. 602 Plates; E.M. 603 Shells; E.M. 604 Vibrations.

Mech.E. 520 (2-3/2; 0-0)

Advanced Combustion Engineering—Detailed study of combustion in engines. Examination of theories of ignition, flame propagation and detonation. Special tests on gas turbine and variable compression C.F.R. Engine.
Selected references.

Mech.E. 521 (0-0; 2-3/2)

Advanced Combustion Engineering (Design)—Study of design problems in combustion engines. Effects of operating and design factors on performance. Design of gas turbines and internal combusition components.
Selected references.

Mech.E. 535 (3-0; 0-0)

Gas Dynamics I—Equations of motion in one dimension. Normal and oblique shock waves. Flow in ducts with heating and cooling. Generalized continuous flow. Wind tunnel operation and techniques.
Textbook: Shapiro, *The Dynamics and Thermodynamics of Compressible Fluid Flow, Volumes I and II.*
Selected references.

Mech.E. 536 (0-0; 3-0)

Gas Dynamics II—Two and three dimensional compressible fluid flow. The small perturbation method. The hodograph method. Numerical calculation methods. The method of characteristics. Methods of measurement.
Textbook: As for Mech.E. 535.
Selected references.
Prerequisite: Gas Dynamics I.

Mech.E. 540 (3-0; 0-0)

Thermodynamics III—Advanced macroscopic thermodynamic techniques. Kinetic theory, statistical mechanics, and information theory as applied to thermodynamics of the pure component and of mixtures. Thermodynamics of irreversible phenomena.
Textbook: Selected references.

Mech.E. 570 (3-0; 0-0)

Conduction Heat Transfer—Fourier's equation for non-isotopical substance. Solutions of steady and transient states for various types of boundary conditions. Exact and approximate methods. Series expansion of various functions. Laplace transforms. Images. Green's function. Potential fields mapping. Variational methods. Integral method. Numerical methods. Analog methods.
Reference: H. S. Carslaw and J. C. Jagaer, *Conduction of Heat in Solids.*
Textbook: Schneider, *Conduction Heat Transfer,* (Addison Wesley).

Mech.E. 572 (0-0; 3-0)

Convection Heat Transfer—The governing equations for convective transport processes. Analogies. Various methods and solutions of boundary layer and

channel flows. Laminar and turbulent flow. Forced and free convection. Approximations for various ranges in Prandtl number. Condensation. Boiling. Two phase flow.
Reference: Rohsenow and Choi, *Heat, Mass and Momentum Transfer,* (Prentice Hall).

Mech.E. 575 (0-0; 3-0)

Thermal Radiation—Principles of radiant energy transfer. Gaseous radiation. Spectral characteristics. Geometrical characteristics of systems involving thermal radiation. Electrical analogy.
Textbook: Selected references.

DEPARTMENT OF MINING AND METALLURGY

In Mining Engineering special courses may be taken in metal mining or mining geology. In Metallurgical Engineering the option may be taken either in extractive metallurgy or physical metallurgy. First and second year courses are the same for Mining Engineering and Metallurgical Engineering. In Metallurgical Engineering, third year is common to both extractive and physical metallurgy options. Course patterns in the fourth year are all different.

Met.E. 252 (2-0; 0-0)

Engineering Materials I—An introduction to the structure of metals and alloys and the relationships between structure, properties, and service behavior.
Textbook: Van Vlack, *Elements of Materials Science.*

Senior Courses—

M.E. 303—T. Patching (2-3/.2; 0-0)

Introduction to Mining—Elements of mining economics, field and geophysical prospecting, sampling and exploration of mineral deposits.
Exercises in the calculation of ore tonnages and grades, and applications of elementary statistics.
Textbooks: Peele, *Mining Engineers Handbook;* Young, *Elements of Mining;* Lewis, *Elements of Mining.*

M.E. 304—T. Patching (0-0; 2-0)

Rock Mechanics and Explosives—Introduction to rock mechanics, strength properties of rock, stress distributions and failure theories, drilling, explosives and blasting, support.
References: Jaeger, *Elasticity, Fracture and Flow;* Isaacson, *Rock Pressure in Mines.*

M.E. 400—T .Patching (3-0; 3-0)

Mining Methods—Mine development; alluvial mining, open-cut mining, stoping and coal-mining methods; mine power, hoisting, haulage; ventilation; mine organization and management; valuation.
References: Beringer, *Underground Practice in Mining;* Roberts, *Mine Ventilation;* Hoover, H., *Principles of Mining;* also Hoover, T. J., *Economics of Mining;* current periodicals and selected reading from other sources.

M.E. 401-403—T. Patching (0-3; 0-6)

Mine Design—Drafting-room work on the exploration, surface, and underground layout of a mine. Working groups of students are formed and to each group is submitted a problem involving the planning and design of a coal or metal mine. Detailed drawings and written discussion, with necessary specifications and costs, are required from each group.

References: Staley, *Mine Plant Design;* Tillson, *Mine Plant;* Easton, *Practical Mine Development and Equipment.*

M.E. 411—T. Patching (0-3; 0-0)

Rock Mechanics Laboratory—Laboratory exercises in determining the physical properties of rock. Studies of simple mine structures under load, and of the behavior of granular or fragmented materials.

Met.E. 333—E .O. Lilge and J. Leja (2-3/2; 3-3/2)

Extractive Metallurgy—Theories of crushing, principles of sizing, movement of solids in fluids, material balance; concentration methods, thickening, filtering Roasting, sintering, direct smelting, matte smelting, distillation and refining methods. Thermodynamics of metallurgical reactions. Technology and physical chemistry of iron and steel production.

References: Bailey, *Textbook of Metallurgy;* Gaudin, *Principles of Mineral Dressing.*

Met.E. 361 (2-3/2; 2-3/2)

Physical Metallurgy—The physical metallurgy of metals and alloys; properties of solid solutions, and mixed phases. Heat-treatment and engineering properties of steels, alloy steels, cast irons and selected non-ferrous alloys. Welding metallurgy. Mechanisms of mechanical and corrosion failure.
Laboratory: Selected exercises to illustrate lecture material.
Textbook: Clark and Varney, *Physical Metallurgy for Engineers.*

Reference Books: Guy, *Elements of Physical Metallurgy;* Samans, *Engineering Metals and Their Alloys.*

Met.E. 404 and M.E. 404

Practical Experience—Before being granted his degree, a student must satisfy the Department that he has had at least six months' practical experience in mining, metallurgy, or geological field work. A suitable report on practical experience must be prepared and submitted to the Department *not later* than December 1 of the fourth year. Before starting to write the report, the student should consult the Department as to the suitability of the topic and the method of presentation.

Met.E. 430—J. Leja (3-0; 0-0)

Properties of Surfaces—Thermodynamics of interfaces, crystalline structure and surface reactivity, adsorption at solid/liquid, solid/gas and liquid/gas interfaces; surface coatings, adhesion, lubrication, emulsification, inhibitors, flotation.
References: Osipow, *Surface Chemistry;* Gatos, *Surface Chemistry of Metals and Semiconductors;* Eley, *Adhesion;* A.S.M., *Metal Interfaces.*

Met.E. 433—E. O. Lilge (0-0; 0-3)

Mill Design—Flow sheet design, calculation of power and capacities for machines, quality control, instrumentation, sampling, testing, plan and elevation of mills, costs.

Met.E. 437—J. Leja and E. O. Lilge (2-3; 2-3)

Extractive Metallurgy II—Magnetic, electrostatic, and heavy media separation, Hydrocyclone. Sintering and roasting operations; extraction and refining processes for: copper, nickel, lead and zinc, light metals; rarer metals. Fuels, refractories, furnaces.
Potential/pH diagrams (Pourbaix) of oxidation and reduction in solution; corrosion; electrolysis of fused metallic salts.
Leaching of copper, nickel, lead, gold and uranium ores; ion exchange, solvent extraction.
Laboratory: Slags, oxidation and reduction processes, gold and silver assay, determination of solute activity in slag or metal, atmospheric and pressure leaching, ion exchange.
References: Ward, *Physical Chemistry of Iron and Steel Making;* Ruddle, *Physical Chemistry of Copper Smelting;* von Arsdale, *Hydrometallurgy of Base Metals;* Pourbaix, *Thermodynamics of Dilute Aqueous Solutions.*

Met.E. 438—W. V. Youdelis (2-0; 0-0)

Kinetics—Application of kinetics principles to extractive metallurgical processes; role of diffusion in the heterogeneous processes of roasting and mineral dissolution; selected problems to illustrate theory.
Reference Books; Laidler, *Chemical Kinetics;* Smith, *Chemical Engineering Kinetics.*

Met.E. 439—E. O. Lilge and J. Leja (0-3; 0-6)

Extractive Metallurgy Project and Design—Project: Slag-metal equilibria; hydrometallurgy of ZnS, $PbSO_4$, gold ore or UO_2.
Design: Calculations for flowsheet design, instrumentation, quality control; plan and evaluation details; costs.

Met.E. 440—E. O. Lilge (0-0; 2-3/2)

Hydrometallurgy—Leaching of copper, nickel, lead, gold and uranium ores, ion exchange, solvent extraction.
Reference: van Arsdale, *Hydrometallurgy of Base Metals.*

Met.E. 460—W. V. Youdelis (3-3; 3-0)

Fundamentals of Physical Metallurgy—Crystal symmetry—point and space group symmetry, crystal lattices. Production and properties of x-rays; x-ray diffraction techniques; interpretation; applications. Theories of imperfections. Deformation of metals. Theory of diffusion and diffusion controlled transformations; order-disorder transformation; martensitic transformations. Solidification theory—segregation in alloys and zone solidification. Electron theory of metals—electron configuration of atoms and the nature of the metallic bond; magnetic, electrical, and thermal properties of metals. Simple thermodynamics of binary systems. Principles of ternary alloy systems.

Reference Books: Barrett, *Structure of Metals;* Darken, *Physical Chemistry of Metals;* Cottrell, *Theoretical Structural Metallurgy;* Hume-Rothery and Raynor, *The Structure of Metals and Alloys.*

Met.E. 461—W. V. Youdelis (3-3; 3-0)

Applications of Physical Metallurgy—Mechanical properties—effect of constitution of metals on the stress-strain curve, significance of true-stress; true-strain relationship, creep, theories of fracture. Advanced metallurgy of steel—heat-treatment, hardenability, brittleness; superalloys. Advanced metallurgy of the commercially important light metals—aluminum, magnesium, zirconium, titanium, with special reference to age-hardening processes. Fabrication processes, Failure of metals in service. Nuclear metallurgy. Gases in metals—thermodynamics and practical problems.
Reference Books: Brick and Phillips, *Structure and Properties of Alloys;* Metals Handbook, A.S.M.; Dieter, *Mechanical Metallurgy.*

Met.E. 466—W. V. Youdelis (0-6; 0-9)

Physical Metallurgy Research Project—Physical metallurgy research project related to current research; e.g. martensitic transformations, solidification of metals, electronic structure of solid and liquid metals, thermodynamics of gas-metal systems, phase diagrams of alloys, amalgam metallurgy.

Met.E. 467 (0-0; 2-3)

Plant Operation and Design—Principles of plant design, production flow and movement, automation in the metallurgical industry, testing, inspection, quality control.

Graduate Courses:*

Met.E. 500—J. Leja (3-3; 0-0)

Metallurgical Thermodynamics—Applications of thermodynamics to pyrometallurgy, hydrometallurgy and corrosion. Effect of surfaces and interfaces. Evaluation of thermodynamical data in metallurgical systems. Selected problems from metallurgical processes.
References: Swalin, *Thermodynamics of Solids;* Pourbaix, *Thermodynamics of Dilute Aqueous Solutions;* Elliott, *Physical Chemistry of Steelmaking.*

Met.E. 501—W. V. Youdelis (3-3; 0-0)

Kinetics of Metallurgical Process—Lectures: Elementary wave and quantum mechanics. Quantum statistics; partition functions. Statistical treatment of reaction rates.
Processes: homogeneous gas and solution reactions; heterogeneous reactions—solid-gas, solid-liquid systems; viscosity and diffusion. Solid state transformations—nucleation, recrystallization, grain growth, precipitation reactions.
Laboratory: Problems: Determination of kinetic parameters: reaction order, activation energies. Calculation of partition functions. Interpretation of rate data for heterogeneous reactions—extractive and physical metallurgy proceses.
Reference: Glasstone, Laidler and Eyring, *Theory of Rate Processes.*

Met.E. 502 (0-3; 0-0)

Advanced Crystallography—Advanced work in determination of crystal structures: single crystal techniques, application of Fourier series; preferred orientation; electron diffraction. Advanced theory of imperfections.

Met.E. 503—J. Leja, W. V. Youdelis (2-0; 2-0)

*Corrosion**—Electrochemical, overvoltage passivity, and reaction rate theories as applied to corrosion processes. Surface Chemistry of corrosion and inhibition. Galvanic and concentration cell reactions, atmospheric and soil corrosion, effect of mechanical factors in corrosion.

References: Evans, *Corrosion and Oxidation of Metals;* Pourbaix, *Thermodynamics of Dilute Aqueous Solutions.*

Met.E. 504—J. Leja (0-6; 0-6)

Flotation—Problems in adsorption of flotation agents, kinetics of particle-bubble attachment and selective-flotation experiments.

Met.E. 505—E. O. Lilge and J. Leja (0-6; 0-6)

Hydrometallurgy—Physical chemistry of pressure leaching. Ionic processes in solution.

Met.E. 506—Staff (2-3; 0-0)

Research Techniques in Metallurgy—Statistical analysis, electron microscopy and electron diffraction, crystal growth, diffuse scattering of x-rays, electron emission, high speed strain measurements, internal friction, radioactive tracers and radiation damage. Zone refining, high pressure and vacuum processes.

Note: The Department reserves the right to offer only those graduate courses for which a sufficient number of students register.

COURSES OFFERED BY OTHER DEPARTMENTS

CHEMISTRY

Chem. 232 (3-3; 3-3)

Modern Chemistry—Lectures: Atomic and molecular structure; states of matter and inter-molecular forces; solution chemistry and chemical equilibrium; inorganic chemistry of selected elements; introductory organic chemistry.

Laboratory: Experiments in general chemistry including some organic chemistry.

Prerequisite: Chemistry 130 or 30 of High School or equivalent.

Chem. 352 (3-2; 3-2)

Organic Chemistry—Lectures: An introduction to a study of the compounds of carbon.

Laboratory: The preparation of some organic compounds.

Prerequisite: Chemistry 230 or 232.

---

*A course in chemical thermodynamics and a course in physical metallurgy are prerequisites.

Chem. 371 (3-1S; 0-0) or (0-0; 3-1S)

Elementary Physical Chemistry—Lectures: Chemical thermodynamics, chemical equilibria, changes of state, properties of solutions and phase equilibria.
Seminar: Problems in Physical Chemistry.
Prerequisite: Chem. 232.

Chem. 432 (3-0; 3-0)

Inorganic Chemistry—Underlying principles of the subject followed by a study of the periodic table.
Prerequisite: Chemistry 230 or 232.
Prerequisite or corequisite: Chemistry 370 or 374.

Chem. 434 (3-3; 3-0)

Inorganic Chemistry—Underlying principles of the subject followed by a study of the periodic table.

Chem. 452 (3-0; 3-0)

Organic Chemistry—Continuation of the study of the aromatic and aliphatic compounds. General considerations and mechanisms involved in their reactions.
Prerequisite: Chemistry 350; 370 or 470.

Chem. 471 (0-0; 2-0)

Electrochemistry—Lectures: the theory of solutions; electrolysis; electrodes and electromotive force; galvanic cells; fuel cells, cell transport phenomena and electrochemical thermodynamics.
Prerequisite: Chem. 374.

Chem. 472 (3-3; 3-3)

Advanced Physical Chemistry—Lectures: Gaseous, liquid and solid states, chemical bonding and molecular structure, kinetics, surface chemistry, and radiation chemistry.
Prerequisite: Chemistry 374.

COMPUTING SCIENCE

C.S. 300. (1-3; 0-0) or (0-0; 1-3)

Compiler Language Programming—An introduction to digital computers. Internal organization; stored program concepts; approach to problems. Machine language coding. Compiler language coding stressing Fortran.

C.S. 458 (2-2; 0-0) or (0-0; 2-2)

Numerical Analysis and Computation Methods—Introduction to linear algebra. Methods of solution for linear algebraic equations. Use of variational principles. Numerical methods for solving equilibrium problems and propagation (or rate) problems. The problems laboratory will make use of desk calculators as well as digital computing facilities of the Department of Computing Science.
Prerequisite: Mathematics 405 or 406 or 407 or equivalent.

ECONOMICS

Econ. 302 (3-0; 3-0)

Principles of Economics—A survey of leading principles with special reference to engineering problems. Selected topics from corporation finance.

Econ. 303 (2-0; 2-0)

Principles of Economics—For Civil, Mechanical, Mining and Metallurgy students.

ENGLISH

English 250 (2-0; 2-0)

The reading of representative works of English literature, with some practice in writing.

GEOLOGY

Geol. 230—H. A. K. Charlesworth (3-0; 0-0) or (0-0; 3-0)

Introductory Geology—Minerals and rocks. Composition, structure and state of the earth. Groundwater. Weathering and soils erosion. Deposition, sedimentary rocks, petroleum and geologic time.
Igneous activity and igneous rocks. Orogenesis, deformation, metamorphism, metamorphic rocks and the origin of mountains. Origin of continents and oceans. Economic geology.
Textbook: As prescribed by the lecturer.

Senior Courses—

Geol. 304 (0-0; 3-3)

Optical Mineralogy—Optical crystallography; physical and optical properties of the rock-forming minerals.
Prerequisite: Geology 303 or consent of department.

Geol. 330 (3-3; 0-0)

Engineering Geology—Minerals and rocks, with emphasis on effects of composition and texture upon engineering properties; Deformation; Weathering and the production of soils, sediments and sedimentary rocks; Landforms and their relationship to geological structure; Hydrogeology, including characteristics of glacier ice; Mapping, including use of aerial photographs and other geological and geophysical methods; Application of geologic principles to engineering problems; field problems, excursions.
Text: To be announced.
Prerequisite: Geology 230 or 232.

Geol. 350—R. A. Burwash (0-3; 0-0)

Petrology—Textbook: Pirsson (third edition, Knopf), *Rocks and Rock Minerals.*
Prerequisites: Geology 230 and 352.

Geol. 401 (3-3; 0-0) or (0-0; 3-3)

Igneous and Metamorphic Petrology—The mineralogy, classification and genesis of igneous and metamorphic rocks; microscopic study of representative samples of the major rock classes.
Prerequisite: Geology 304 and 306 or consent of department.

Geol. 402—H. A. K. Charlesworth (3-3; 0-0)

Principles of Structural Geology—Theoretical structural geology; non-orogenic structures; faults; folds; elementary petro-fabric analysis; problems on folding and faulting.

Prerequisite: Geology 303 and Physics 240, or consent of department.

Geol. 404—F. A. Campbell (3-3; 0-0)

Mineralogy (Mining Engineering)—A systematic study of minerals, their chemical and physical properties and modes of occurrence.

Prerequisite: Geology 230 or consent of department.

Geol. 406—H. A. K. Charlesworth (0-0; 3-3)

Geotectonics—Origin and gross tectonic framework of ocean basins, continental margins and continents; causes of orogenesis; structural geology of North America; problems on folding and faulting; interpretation of geologic maps.

Prerequisite: Geology 402.

Geol. 460—R. E. Folinsbee (0-0; 3-3)

Metallic Mineral Deposits—Classification, mode of occurrence, and geological relations of various types of mineral deposits.

Textbook: Bateman, *Formation of Mineral Deposits.*

Prerequisite: Geology 404 or consent of department.

Geol. 461 (0-0; 3-3)

Geology of Petroleum, Natural Gas and Coal—Classification, mode of occurrence and geological characteristics of petroleum, natural gas and coal deposits.

Textbook: Levorsen, *Geology of Petroleum.*

Prerequisite: Geology 230 or consent of department.

Geol. 462 (1-3; 0-0)

Photogeology—The application of aerial photographs to the preparation of planimetric and geological maps.

Prerequisite: Geology 201 or consent of department.

Geol. 465 (3-3; 0-0)

Geomorphology—A study of land forms and the processes which create and modify them, map reading; field trips.

Prerequisite: Geology 201 or consent of department.

Geol. 466—L. A. Bayrock (0-0; 3-3)

Glacial Geology—A study of glacial features and their relation to physiographic environment; field trips.

Prerequisite: Geology 201 or consent of department.

MATHEMATICS

Junior and Senior Courses—

Math. 202 (4-0; 4-0)

Elementary Mathematics—Review of algebra. Limits. Differentiation. Ingration. Analytic geometry of conic sections. Trigonometric, logarithmic and

exponential functions. Geometrical and physical applications of differentiation and integration. Methods of integration. Approximate integration. Parametric equations. Polar co-ordinates. Introduction to partial derivatives.
Prerequisite: Mathematics 30 and 31.

Math. 303 (5-0; 5-0)
Calculus and Analytical Geometry—Parametric Equations. Polar coordinates. Determinants. Applications of integration. Hyperbolic functions. Vectors and solid geometry. Partial differentiation. Multiple integration. Infinite Series. Elements of differential equations.
Prerequisite: Mathematics 202.

Math. 404 (3-0; 3-0)
Advanced Calculus—Vector analysis. Ordinary differential equations. Series solutions of differential equations. Gamma, Bessel and Legendre functions. Fourier series. Boundary value problems.
Prerequisite: Mathematics 304 or its equivalent.

Math. 405 (3-0; 3-0)
Advanced Calculus—Matrices. Ordinary differential equations. Series solutions of differential equations. Zeros of polynomials. Fourier series and Fourier integral. Laplace transforms. Introduction to theory of complex variable. Vector analysis. (For Electrical Engineers.)
Prerequisite: Mathematics 303.

Math. 406 (3-0; 3-0)
Advanced Calculus—Ordinary differential equations. Series solutions of differential equations. Partial differentiation and partial differential equations. Gamma and Bessel functions. Fourier series. Numerical methods. Boundary value problems. (For Chemical and Petroleum Engineers).
Prerequisite: Mathematics 303.

Math. 407 (3-0; 3-0)
Advanced Calculus—Ordinary differential equations. Series solutions of differential equations. Fourier series. Partial differentiation and partial differential equations. Vectors. Boundary value problems. (For Mechanical and Metallurgical Engineers).
Prerequisite: Mathematics 303.

Math. 408 (3-0; 0-0) or (0-0; 3-0)
Theory of Functions of a Complex Variable—Complex numbers. Complex series. Functions of a complex variable. Cauchy's theorem and contour integration. Conformal mappings. Schwartz Christoffel transformation. Inverse Laplace transforms.
Prerequisite or corequisite: Mathematics 405 or 406 or 407.

Math. 430 (3-0; 3-0)
Advanced Mechanics—Central orbits. Scattering theory. Harmonic oscillator. Normal modes of vibration. Space motion of a rigid body. Relative motion. Tops and gryoscopes. D'Alembert's principle. Generalized coordinates. Lagrange's equations. Hamilton's principle.
(For students in the third year of Engineering Physics.)

Math. 480 (3-0; 0-0)

Cartesian Tensors and Applications—Euclidean vector spaces. Linear transformations and matrices. Algebra of cartesian tensors. Vector and tensor calculus. Determinants. Structure of second-order tensors. Isotropic tensors. Physical applications.
Prerequisite or corequisite: Mathematics 404 or 405 or 406 or 407.

Math. 500 (3-0; 3-0)

Theory of Functions of a Complex Variable—Complex numbers. Complex series. Functions of a complex variable. Cauchy's theorem and the calculus of residues. Integral functions. Conformal representation. The Laplace and Fourier transforms.
Prerequisite: Mathematics 405 or 406 or 407.
(For students in the fourth year of Engineering Physics).

Math. 555—J. R. Pounder (3-0; 3-0)

Hydro- and Aero-dynamics—Classical hydrodynamics. Kutta-Joukowski theory of airfoils. Boundary layers. Flow of a viscous fluid. Supersonic flow. Shock waves.

PHYSICAL EDUCATION

All first-year students are required to register in Physical Education 218—*Men or Physical Education* 228—*Women.*

Phys.Ed. 218—Physical Education Staff (0-2; 0-2)

Recreational Activities (Men)—Emphasis on the fundamentals of the following recreational and fitness activities: circuit training, aquatics, handball, badminton, volleyball, tumbling and apparatus.

Phys.Ed. 228—Physical Education Staff (0-2; 0-2)

Recreational Activities (Women)—Emphasis on the fundamentals of the following recreational and fitness activities: aquatics, movement fundamentals, tennis, badminton, dance and golf.

PHYSICS

Physics 230 (3-3/2; 2-3/2)

Mechanics, Electricity and Magnetism—Mechanics: introduction to dynamics, conservation laws. Electricity and Magnetism: electrostatics and the electric field, potential, capacitance, DC circuits, magnetic fields, electromagnetism, induced EMF, magnetic properties of materials.

Physics 330 (3-3/2; 3-3/2)

Modern Physics, Wave Motion and Electricity—Electrodynamics, wave motion and sound, physical optics of interference and diffraction, special relativity, structure of the atom, introduction to theory of solids.
Prerequisites: Physics 230, Mathematics 202.

Physics 416—S. S. Sheinin (2-0; 2-0)

Introduction to Wave Mechanics and Theory of Solids—The Schrodinger equation, quantum statistics, bending forces, electron theory of solids, properties of metals and semi-conductors.
Prerequisites: Physics 330, Mathematics 303.

Physics 430—H. R. Krouse (3-3/2; 3-0)

Advanced Electricity and Magnetism—Vector treatment of electric and magnetic fields, scalar and vector potentials, Maxwell's equations, electro-magnetic waves in homogeneous media, boundary conditions, and reflection and refraction standing waves, wave guide theory. Dualistic nature of light, wave mechanics, selected topics in modern physics and solid state.

Physics 474 (1-0; 3-0)

Relativity and Introduction to Wave Mechanics—Special relativity, wave mechanics; introduction to Schrodinger equation; solutions for plane waves, hydrogen-like atom, periodic fields; introduction to perturbation methods; vector model of the atom.
Prerequisite: Physics 330.
Prerequisite or corequisite: Mathematics 404.

Physics 468 (0-3; 0-3)

Advanced Laboratory—Methods in experimental atomic physics, spectroscopy and nuclear physics; introduction to modern laboratory techniques.
Corequisite: Physics 470.

Physics 480—S. B. Woods (3-3; 3-3)

Electromagnetism—Potential theory; description of electromagnetic field using vector methods; Maxwell's equations; electromagnetic waves in continuous media and in guides; selected topics in electromagnetism.
Prerequisite: Physics 340 or 380.
Prerequisite or corequisite: Mathematics 421 and 422.

Physics 482 (3-0; 3-0)

Electromagnetism—Same as Phys. 480 for students in Engineering Physics.

Physics 510—F. D. Manchester (3-0; 3-0)

Thermodynamics and Kinetic Theory—Principles of thermodynamics with physical applications, kinetic thseory, transport phenomena, Boltzmann, Fermi-Dirac and Bose-Einstein statistics, thermodynamics of irreversible processes.
Prerequisites: Physics 340 or 380, Mathematics 303 or 304.

Physics 516—F. L. Weichman (2-0; 2-0)

Solid State Physics—An introduction to the theory of solids, including a study of the properties of metals, semiconductors and dielectrics.
Corequisite: Physics 570.

Physics 520 (3-3; 3-3)

Geophysics—Physical structure of the earth. Earthquake and explosion seismology, gravity, heat flow and age determination, tectonophysics. Geomagnetic, paleomagnetic and electromagnetic methods in the study of the earth. Methods of geophysical exploration.
Prerequisites: Mathematics 404.
Prerequisite or corequisite: Physics 482.

Physics 530—S. N. Bagchi (2-0; 2-0)

Physics of Atoms, Nuclei, and Crystals—Relativity physics, quantum theory and wave mechanics, atomic structure and spectra, high-energy radiations, nu-

clear structure, nuclear reactions and energy sources, quantum statistics, crystalline properties of the solid state.
Prerequisites: Physics 430, Mathematics 404, or equivalents.

Physics 550—M. Razavy (3-0; 3-0)

Mathematical Physics—This course is intended as an introduction to the principal mathematical methods of dealing with the scalar and vector fields of physics. Topics include the Sturm-Liouville theory of eigenvalue problems, matrices, partial differential equations, operational methods and Laplace transforms, Fourier transforms, Green's functions, integral equations and the nonlinear equations of hydrodynamics. One hour per week will be spent on class discussion of problems.
Prerequisite: Mathematics 421 and 422.
Prerequisite or corequisite: Phys. 480.

Physics 570—B. V. Paranjape (3-0; 3-0)

Relativity and Quantum Mechanics—Special theory of relativity. Introduction to quantum mechanics with applications to atomic and modern physics.
Prerequisite: Physics 470, Mathematics 421 and 430, or equivalents.
Prerequisite or corequisite: Phys. 480.

Physics 572—G. C. Neilson (2-0; 2-0)

Nuclear Physics—Introductory survey of modern experimental and theoretical nuclear physics.
Corequisite: Physics 570.

STATISTICS

Statistics 450. (3-0; 3-0)

Probability and Statistics—Theory of probability. Distribution functions. Central limit theorem. Sampling distributions. Confidence intervals. Statistical inference. Method of least squares. Analysis of variance.
Prerequisite: Mathematics 303.
(Some previous knowledge of elementary statistics is advisable.)

XIV

The School of Household Economics

INFORMATION, REGULATIONS, COURSES

(1) INTRODUCTION

Degree programs in Household Economics have been offered at the University of Alberta since 1918, when a department of Household Economics was established. In 1928 the School of Household Economics was organized under the Faculty of Arts and Science. In 1963, it was placed under the newly-organized Faculty of Science.

The course of study is designed to provide the student with a foundation in Arts and Science and Household Economics. The program is a three-year one (the first year may be taken at the University of Alberta, Calgary). Additional study or training must be completed if the graduate wishes to obtain a teacher's certificate or a Bachelor of Education degree (see Faculty of Education Calendar), or if she wishes to become a dietitian. To qualify as a professional dietitian, the graduate must spend twelve months in an interneship program approved by the Canadian Dietetic Association. It is now possible for a student to complete part of this twelve month interneship during the summers between university sessions, thus integrating interneship with university study; the student is paid during the time she is serving interneship each summer.

During the first two years all students follow a common program of study. In the third year the student may choose to emphasize either the study of foods or the study of clothing.

Graduates who have completed a program in which the study of *foods* was emphasized may secure positions as dietitians, teachers, home economists and nutritionists. Post-graduate study in foods and nutrition may be pursued at this or another university, and financial aid is usually available; excellent opportunities are open to the holder of a Master's or Ph.D. degree.

Graduates who have completed the program in which the study of *clothing* was emphasized may secure positions as teachers, or as home economists in the Department of Agriculture. The study of textiles and clothing and applied art may be continued in post-graduate programs in other universities.

Graduates who have completed a program emphasizing *either foods or clothing,* and who have particular aptitudes for work in radio, television and journalism, may find opportunities in these fields. It is possible for graduates who are interested in social work to pursue this interest by enrolling in a degree program in some schools of Social Work; it should be realized, however, that only certain personality types will succeed in social work.

Students are invited to consult the Director of the School with respect to the choice of courses.

(2) ADMISSION

For the degree of B.Sc. in H.Ec.:

(a) a High School diploma with

(b) "B" or higher standing in

1. English 30,
2. Social Studies 30,
3. Mathematics 30,
4. French 30 or German 30 or Latin 30, or another language at an equivalent level,
5. Chemistry 30, and
6. Physics 30 (preferred) or Biology 30 (Biology 32 will be accepted until and including September 1965).

(c) an average in these six courses of at least 60%.

These general regulations notwithstanding, the University may in its discretion, refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

(3) PROMOTION

The promotion of a student from the first to second year is contingent upon the satisfactory completion in one year of a first year of normal weight. This regulation applies also to students from other universities. To be granted the degree of B.Sc. in Household Economics students must make a passing mark or better in all courses and obtain an average of 60 per cent in all courses credited to the degree after the first year. For purposes of implementing this regulation, marks obtained in Microbiology 201 and Household Economics 303 will be averaged as one, as will marks obtained in Household Economics 456, 457 and 459 (or 456 and 459 for students following the "clothing pattern"). A student will not be allowed to write more than five supplemental examinations for the purpose of obtaining passing marks or raising her average to the required 60 percent. A student will not be allowed to write more than two supplemental examinations in any year.

A student who is repeating a year will be granted no supplemental privileges in the courses taken that year and must pass all courses with a 60 percent average to be allowed to continue. The privilege of repeating a year will be granted to a student not more than once during her candidacy for a degree in this School, unless by special permission of the Director.

Students who interrupt their degree program are warned that after an absence of two calendar years from academic study at university level they may be required to comply with any new regulations which have come into effect in regard to their program and requirements. If the absence has been of more than five years' duration, the student may be required to take placement tests.

(4) PROGRAM OF STUDY FOR THE B.Sc. DEGREE IN HOUSEHOLD ECONOMICS

First Year

English 210 or French 200 or German 200 or Latin 200; Chemistry 230; Chemistry 250; Biology 130 (for students lacking Biology 30) or Biology 230 (for students having Biology 30); Household Economics 202; Physical Education.

Second Year

An approved Arts option (See Arts calendar and Science calendar); Physiology 360; Biochemistry 300; Household Economics 304; Microbiology 201, first term; Household Economics 303, second term.

Third Year

One Arts option (see Arts calendar and Science calendar); Household Economics 451, 454, 456, 457, 458, 459; an approved option.

Students interested in clothing and design and not planning to become dietitians may elect Household Economics 460 instead of Household Economics 451, 454, 457; they must select Household Economics 350 as one of their options.

(5) B.Sc. IN HOUSEHOLD ECONOMICS AFTER B.Ed.

Students who have qualified for the degree of Bachelor of Education may proceed to the degree of Bachelor of Science in Household Economics if they have the matriculation requirements of the School of Household Economics, and have completed at least thirteen courses in Arts and Science and Household Economics. They will be required to complete the B.Sc. program with a minimum of six senior courses. Such students will be required to obtain a 60% average in these courses.

(6) GRADUATE STUDIES

Graduate work leading to the degree of Master of Science may be undertaken in the Department of Household Economics. The major work may be done in the field of nutrition where excellent facilities are available for a limited number of students interested in fundamental research. Students wishing to pursue graduate work should consult the Director of the School of Household Economics and familiarize themselves with procedures and regulations laid down by the Faculty of Graduate Studies.

(7) DETAILS OF COURSES

The University reserves the right to modify or withdraw for the session any of the courses here outlined.

Students are reminded of the regulations regarding attendance requirements and debarment from final examinations.

NOTE: In the case of courses in which the weekly hours of instruction are fixed, these are set out for both terms of the winter session. The first figure in each term indicates lecture-hours and the second laboratory-hours.

BIOCHEMISTRY

Biochemistry 300—Members of Staff (3-3; 3-3)

General Course—Structure and chemistry of the cell; acidimentry and alkalimetry; chemistry of carbohydrates, lipids, proteins and nucleic acids; enzymes; bioenergetics; digestion, absorption and intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids; mineral metabolism; vitamins; blood chemistry; chemistry of respiration.

Prerequisites: Chemistry 230, Chemistry 250.

BIOLOGY

Biology 130 (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biology 230 (3-3; 3-3)

1st Term or 2nd Term

Plant form and function. Comparative morphology and physiology of plants at an intermediate level.

2nd Term or 1st Term

Comparative Zoology. Animal morphology, physiology and development at an intermediate level.

Prerequisite: Biology 30 or 130.

CHEMISTRY

Chemistry 130 (3-3; 3-3)

Introductory General Chemistry—Lectures: An elementary introduction to chemistry illustrated by the chemistry of metals, non-metals and carbon compounds.

Laboratory: Experiments related to the lecture material.

Chemistry 230 (3-1S-3)(3-1S-3)

Inorganic Chemistry—Lectures: The fundamental concepts of chemistry as applied to the elements and their compounds.

Laboratory: The preparation of compounds, quantitative chemistry and semi-micro qualitative analysis.

Prerequisite: Chemistry 130 or Chem. 30 of High School or equivalent.

Chemistry 250 (3-3; 3-3)

Organic Chemistry—Lectures: An introduction to a study of the compounds of carbon.

Laboratory: The preparation of some organic compounds.

Prerequisite: Chemistry 130 or Chem. 30 of High School or equivalent.

ENGLISH

English 210 (3-0; 3-0)

English Language and Literature—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Texts: To be announced.

HOUSEHOLD ECONOMICS

STAFF:—

Professor and Director of the School—Elizabeth L. Empey

Associate Professors—Grace L. Duggan, Ruth Renner

Assistant Professors—Thelma Dennis, Helen Moseson, Zenovia Hawrysh, Helen Bentley

Lecturer—Corinne Greschuk

Instructors—Grace E. Cairns (Dietitian, University Cafeteria), Margaret Gibbard (Dietitian, University Residences), Venita Menges (Assistant Dietitian, University Residences)

Household Ec. 202—H. Bentley (3-3; 3-3)

Textiles and Clothing—A study of the composition, manufacture and properties of fabrics, their use and care. The selection of clothing in relation to the individual. The use of commercial patterns in garment construction. Fitting. Sewing techniques as they apply to specific fabrics and to various types of garments.

Household Ec. ‡210—C. Greschuk (3-3; 3-3)

Foods and Nutrition—An elementary study of the composition and nutritive value of foods, with laboratory practice in food preparation, meal planning and service.

Household Ec. 303—T. Dennis (0-0; 3-3)

Household Management—Materials found in the home; principles involved in their care; the house, its equipment and furnishings; labor-saving devices.

Household Ec. 304—Z. Hawrysh (3-5; 3-5)

Foods—The theory and practice of food preparation; meal planning and table service.
Prerequisite: Chemistry 250.

Household Ec. 350—T. Dennis (3-3; 3-3)

Applied Art—A study of the principles of design and the theory of color. Creative problems including block printing, stencilling, stitchery, and other techniques. Historic styles of architecture and furniture and their relation to modern design. The planning of a contemporary house and its furnishings.

Household Ec. 451—Members of the Staff (0-0; 2-3)

Institutional Management—The organization and administration of food services in institutions. This will include some observation and practice in various food services.

Household Ec. †453—G. L. Duggan (3-0; 0-0)

Family Finance—Standards of living; family income, savings and expenditures; consumer economics and consumer education.

Household Ec. 454—Z. Hawrysh (0-3; 0-3)

Experimental Cookery—Observation of the chemical and physical principles involved in food preparation, and of the effect on finished product of altering various preparation procedures. Survey of recent developments in food preparation and food research. An introduction to food research procedures, by means of an individual experiment which will be planned, conducted and reported by each student.
Prerequisite: H.Ec. 304.

Household Ec. 455—G. L. Duggan (2-0; 2-0)

Economics of the Household—The history of family life, family relationships, homemaking, standards of living; household production, the income and its expenditure, budgets, consumer education.

---

‡For students in Education and Arts and Science.

†For Education students only.

Household Ec. 457 (0-0; 1-3)

Diet and Disease—Food and diet for the sick. Description of various diseases, and of the role of diet in managing them.
Co-requisite: H.Ec. 458.

Household Ec. 458—E. Empey and R. Renner (3-3; 3-3)

Nutrition—The principles of nutrition applied to the feeding of individuals and of the family group under normal conditions. Diets for special cases.
Prerequisite: H.Ec. 304 and Biochemistry 300.

Household Ec. 459 (3-3; 0-0)

Methods of Presentation—A course in methods of presentation of subject matter in household economics; practical experience in demonstrations and other forms of communication.
Prerequisite: H.Ec. 304.

Household Ec. 460—H. Moseson (3-3; 3-3)

Advanced Clothing—The study of historic and contemporary costume design. The development of the foundation pattern. Flat pattern designing, draping and tailoring for selected garments and construction in appropriate fabrics.
Prerequisite: H.Ec. 202.

Household Ec. 461—R. Renner (0-0; 3-0)

Nutrition—The chemical, physiological and nutritional aspects of vitamins and minerals.
Prerequisite: Biochemistry 300 or H.Ec. 464.

Household Ec. †464—R. Renner, Z. Hawrysh (3-3; 3-3)

Nutrition and Experimental Cookery—Advanced study of the principles of nutrition and of food preparation. The laboratory work will be mainly experimental cookery.
Prerequisite: Chemistry 250 or 350 and H.Ec. 210.

MICROBIOLOGY

Microbiology 201 (3-3; 0-0)

Elementary Bacteriology—General bacteriology; the importance of bacteria in everyday life. Demonstrations and practical laboratory exercises.

PHYSICAL EDUCATION

All first-year students are required to register in Physical Education.

Phys. Ed. 228—Physical Education Staff (Women) (0-2; 0-2)

Recreational Activities—Emphasis on the fundamentals of the following recreational and fitness activities: aquatics, movement fundamentals, tennis, badminton, dance and golf.

PHYSIOLOGY

Physiology 360—K. M. Chapman and Members of the Department of Physiology (3-0; 3-0)

Elementary Human Physiology—This course comprises a study of the

†For Education students only.

essentials of human physiology. For students of Household Economics.
Prerequisites: Zoology 220 or Biology 130 or 230 and Chemistry 350 or Chemistry 250.
Textbook: Winton and Bayliss, *Human Physiology*, 5 ed,. 1962; Bell, Davidson and Scarborough, *Textbook of Physiology and Biochemistry*, 5 ed., 1961, is a suitable alternative text.

XV

The Faculty of Law

INFORMATION, REGULATIONS, COURSES

INTRODUCTION

The course offered by the Faculty of Law is designed to qualify a student for the practice of law in any jurisdiction in which the Common Law prevails. It is also designed to offer training for business and government administration.

Completion of the course in the Faculty of Law at this University leads to the degree of Bachelor of Laws. The course requires a student's full time attendance for three academic years.

A graduate of the Faculty of Law who wishes to enter upon the practice of law must meet the requirements of the jurisdiction in which he desires to practise. The Province of Alberta requires the resident student graduate to article with a practising member of the Bar and serve under him for one year; at the end of this period and upon fulfilling certain other conditions he is formally admitted by a judge of the Supreme Court to the practice of Law in this province.

Students in the Faculty have the opportunity to prepare and submit articles for inclusion in the Alberta Law Review. The Review, published annually by an editorial board of students advised by members of the Faculty, circulates widely among members of the profession in Alberta and, in response to requests received, in other provinces and abroad.

ADMISSION REQUIREMENTS

The entrance requirement of the Faculty of Law is:

(a) Either the degree of B.A. or an equivalent degree as accepted by the Committee on Admissions, or

(b) the completion of two years of the combined B.A., LL.B., course as offered by the University.

The matriculation requirements for the combined course are the same as for the B.A. program, namely:

(a) a High School Diploma with

(b) "B" or higher standing in English 30, Social Studies 30, Mathematics 30, French 30 or German 30 or Latin 30 (or another approved language at an equivalent level) and *two* of Chemistry 30, Physics 30, Biology 30 or 32, a second approved Grade XII language; and

(c) an average in these six courses of at least 60%.

Students who have completed matriculation in accordance with the requirements set forth in previous calendars should submit two transcripts of their high school record to the Registrar of the University for evaluation.

These general regulations nothwithstanding, the University may in its discretion refuse admission to any applicant.

An applicant holding a B.A. or an equivalent degree is not automatically entitled to admission to the Faculty of Law. The whole record of each applicant is examined by a Committee of the Law Faculty Council which has power to decide whether he shall be admitted. A weak academic performance is a basis for refusal.

APPLICATIONS

Students planning to enter first year Law, *excluding those in the combined course of Arts and Law,* should apply for admission on or before August 4, whether they have previously attended this University or not. Where possible they should also arrange for a personal interview with the Dean of the Faculty before that date.

Students who have successfully completed the second year of the Combined Course need not make application. They will receive from the Dean of Law a letter confirming their eligibility to enter first year of law.

PROMOTION

In the case of a student adversely affected by these regulations the Faculty Council takes into consideration all circumstances within its knowledge which might justify any deviation from the regulations.

1. The pass mark in each subject is 50 per cent, except where otherwise specified.
2. Students in the combined course are required to secure an average of 60% in each of the first two years. In addition, they must obtain second class standing in at least four courses, two of which must be for the second year, before promotion to the third year of the combined course is permitted.
3. Students in each of the three years in Law are required to obtain an average of 60% on the whole of the work of the respective years. If such an average is not obtained by any student in any year, such student will be required to repeat the whole of the work of that year before taking more advanced work.
4. All students for the degree of LL.B. are required to pass a viva voce examination at the end of the third year unless specially exempted by the Faculty. This examination is to be of a general character covering the work of the three years.

Students taking the combined course of B.A., LL.B. are referred to the calendar of the Faculty of Arts and Science for the regulations which apply to students under its jurisdiction.

DETAILS OF THE PROGRAM FOR THE DEGREE OF BACHELOR OF LAWS

All students in first and second years will take part in a moot court argument.

All students in third year will participate as judges in first-year moots.

NOTE: The hours of instruction for both terms of the winter session are shown at the top of each descripion. The first figure in each term indicates lecture-hours and the second laboratory-hours.

Staff of the Faculty

Professors—W. F. Bowker (Dean), A. Smith, A. R. Thompson
Associate Professors—W. H. Angus, I. L. Head, D. J. Sherbaniuk
Assistant Professor—D. T. Anderson
Sessional Instructors—W. Anderson, J. Brumlik, D. C. McDonald, A. F. Moir, Wm. Stevenson

First Year

Law 400—D. T. Anderson (3-0; 0-0)

Introductory Course—An introduction to the nature and scope of law with reference to the main divisions of English law, the growth of common law and equity, the sources of the law and the doctrines of precedent and principal rules of statutory construction. The forms of action at common law and the history of pleading are studied together with a brief examination of modern procedures. A study is made of the Courts of Alberta and the Federal Courts, the growth of legal professional literature and the development of the courts in England and Canada.
Selected Readings.

Law 401—A. Smith (3-0; 3-0)

Contracts—Intention to create legal obligations; certainty of terms. Offer and acceptance. Extent to which acceptor bound by conditions of which he is not aware. Genuineness or reality of consent. Form. Parties. Impossibility of performance. Discharge of contract.
Kenny, *Cases on Contract;* Cheshire and Fifoot, *Cases on Contract;* Williston, *A Selection of Cases on Contract;* Anson, *Principles of the English Law of Contracts;* Pollock, *Principles of Contract;* Cheshire and Fifoot, *The Law of Contract;* Wright, *Cases on Contract.*

Law 402—W. F. Bowker (4-0; 4-0)

Torts 1—Intentional interference with the person and with land and chattels; the defences thereto; negligent interference with person and property and the defences thereto; contributory negligence and assumption of risks; death in relation to tortious liability; liability of occupiers of land.
Wright, *Cases on the Law of Torts,* 1963; Selected Readings.

Property 1

Law 403 (4-0; 2-0)

(a) *Real Property*—A. R. Thompson—(2-0; 2-0)—The historical background of land in Alberta: in particular, tenure and estate, future interests, concurrent interests. dower rights and incorporeal inteests. The Torrens systems is related to the land law by a general introduction to the subject of land registration.
Cheshire, *Modern Real Property;* Megarry and Wade, *Law of Real Property;* Laskin, *Cases and Notes on Land Law.*
(b) *Personal Property*—D. Sherbaniuk—(2-0; 0-0)—The nature of personal chattels. Real and personal property distinguished. Property and possession. Transfer of possession. Gifts. Bailment. Duties and liabilities of bailors and bailees *inter se.* Third-party relationship to bailment. Liens and pledges. Acquisition of title without consent of former owner. Bills of Sale Act.
Goodeve, *Personal Property;* Laskin, *Cases and Materials on Personal Property;* Williams, *Personal Property.*

Law 404—W. Angus (2-0; 2-0)

Criminal Law—A study of the substantive law of crimes. Consideration of general common law principles and their relevancy to the Criminal Code of Canada is followed by a review of selected offences under the Code. Special problems such as "constructive" murder and insanity receive particular attention.

Mackay, *Cases and Materials on Criminal Law* (1958); *Martin's Criminal Code* (1955 ed. and current annual).

Law 405—D. T. Anderson (1-0; 1-0)

Agency—The relationship of Principal and Agent. Capacity of Parties. Appointment of Agents. Married Women as Agents of their husbands. Delegation. Agents binding their Principals; Actual authority; Ostensible Authority and holding out; Contracts under Seal executed by Agents. Ratification. Undisclosed Principals. Duties of Agent to Principal. Duties of Principal to Agent. Determination of agency. Partnership.

Wright, *Cases on Agency;* Powell, *The Law of Agency;* Friedman, *The Law of Agency.*

Law 406—W. Anderson (0-0;2-0)

Criminal Procedure—Jurisdiction, procedure and powers of criminal courts. Steps from commission of crime to final adjudication on appeal at all levels of criminal jurisdiction. Crown practice. The Criminal Code of Canada, Parts XI-XXIV; Federal and Provincial Statutes; selected cases.

Second Year

Law 430—D. C. MacDonald (2-0; 2-0)

Evidence—The adversary system in trial and appellate courts; relevance and admissibility; character evidence including similar facts; opinion evidence; the hearsay rule and its exceptions; illegally obtained evidence; judicial notice; burdens of proof and presumptions; quantum of proof; corroboration; competence, compellability and privilege; a parol evidence rule; oaths and affirmations.

Morton, *Cases and Materials on Evidence;* Cross, *Evidence;* selected readings.

Law 431—W. H. Angus (2-0; 2-0)

Trusts—A brief survey of the historical development of the trust introduces an intensive study of the specialized areas of this institution. Particular attention is given to the intricacies of charitable trusts and the following of trust assets.

Weston, *Cases and Materials on Wills and Trusts* (1957); Keeton, *Law of Trusts* (7th ed., 1957).

Law 432—A. R. Thompson (3-0; 3-0)

Commercial Law—Bills and notes and sales of goods are studied intensively on the basis of the statutes, cases and texts. The case law concerning bills of sale, chattel mortgages and conditional sale contracts is examined. Creditors' rights under particular statutes including the Bankruptcy Act are treated generally with emphasis upon setting aside fraudulent conveyances, executions, seizures and suretyship.

Falconbridge, *Banking and Bills of Exchange; Benjamin on Sale;* Chalmers' *Sales of Goods;* Atiyah, *Sale of Goods.*

Law 433—J. Brumlik (1-0; 1-0)

Insurance Law—This course covers some of the general principles affecting insurance contracts including good faith, indemnity, subrogation and insurable interest and then goes on to consider in some detail particular problems arising out of The Alberta Insurance Act in relation to automobile, life and fire insurance.

U.B.C. Cases and Materials on the Law of Insurance; The Alberta Insurance Act.

Law 434—D. Sherbaniuk (2-0; 2-0)

Wills and Administration—Principles of the Wills Act, including formalities of execution, revocation, revival, republication, types of legacies and principles of construction. Testamentary capacity, fraud and undue influence. Drafting of wills. Appointment of executors and administrators, their powers and duties; probate practice.

Theobald, *Wills,* 11th ed.; Jarman, *Wills,* 8th ed.; Bailey, *Wills,* 3rd ed.; Mustoe, *Executors,* 4th ed.; Widdifield, *Executors' Accounts.*

Law 435—A. Smith (2-0; 2-0)

Canadian Constitutional Law—Principles applicable to proceedings by and against the Crown and its agencies, including Petitions of Right and declaratory judgments. The British North America Act, particularly the division of legislative jurisdiction between Dominion and provinces.

The British North America Act; selected cases and statutes; Laskin, *Canadian Constitutional Law.*

Law 436—W. F. Bowker (0-0; 2-0)

Domestic Relations—Promise to marry and breach thereof. Marriage as a contract. Marriage as a status. Presumption of valid marriage. Void and voidable marriages: minors; mental incapacity; mistakes; duress; degrees of affinity and consanguinity; impotency. Divorce. Judicial separation. Cruelty. Condonation. Collusion.

Smith and Guttman, *Cases and Materials on Domestic Relations.*

Law 437—D. T. Anderson (0-0; 2-0)

Torts 2—Strict liability; defamation; deceit; interference with advantageous relations; also the law of master and servant with particular reference to the law of torts.

Wright, *Cases on the Law of Torts,* 1963

Law 438—W. H. Angus (2-0; 0-0)

Administrative Law—This course is designed to provide a practical appreciation of the administrative process in relation to its judicial counterpart. As well as studying the customary areas of delegation, characterization of function, natural justice, judicial review and remedies, the student will participate in a project requiring study of a particular administrative tribunal.

Angus, *Cases and Materials on Administrative Law* (1962); de Smith, *Judicial Review of Administrative Action* (1959); Griffith and Street, *Principles of Administrative Law* (2nd ed., 1957).

Third Year

Law 460 (3-0; 3-0)

Real Property 2—

(a) (2-0; 2-0)—A. R. Thompson—The law relating to land transactions with particular reference to the Land Titles Act; the law of landlord and tenant and of other incorporeal interests in land.

Thompson, *Cases and Notes on Land Titles;* Thom, *Canadian Torrens System;* Megarry and Wade, *The Law of Real Property;* Williams, *Canadian Law of Landlord and Tenant.*

(b) (1-0; 1-0)—A. F. Moir—The law governing agreements for sale of land: the open contract of sale; implied terms; special covenants in agreements for sale. Remedies of vendors and purchasers; election of remedies; cancellation and determination clauses. Deposits and instalments. Mortgages: legal, equitable and statutory. Foreclosure; sales; redemption; possession and attornment.

McCaul, *Remedies of Vendors and Purchasers;* Falconbridge, *Law of Mortgages.*

Law 461—Wm. Stevenson (1-0; 1-0)

Equity—Historical introduction. Nature of Equitable Rights. Priorities: *Bona Fide* Purchaser for value without Notice: *Qui prior est tempore potior est jure,* and the rule in Dearle v. Hall. Doctrines of Conversion, Election, Performance, Ademption and Satisfaction. Mistake, Misrepresentation, Fraud, and Undue Influence. Penalties and Forfeitures. Restrictive Covenants.. Injunctions. Specific Performance. Mutuality. Part Performance.

Smith and Read, *Cases on Equity;* Maitland, *Equity;* Hanbury, *Modern Equity;* Snell, *Principles of Equity.*

Law 462—Ivan Head (2-0; 2-0)

Practice—A study of the fundamentals of judicial procedure: the jurisdiction of the courts, and the process of the courts. A portion of the course consists of clinical sessions and observation in court of the several forms of judicial hearings.

Rules of Court.

Law 463—W. F. Bowker (1-0; 1-0)

Recent Cases and Legislation—Students are given a series of practical problems, usually involving statute law as well as case law, and are required to give an opinion or write a brief. Stress is laid on the technique of research and of writing; certain recent cases are critically examined, and relevant statutes are studied from the standpoint of statutory construction as well as content. Each student is required to write a case comment on a recent Canadian case.

Law 464—D. Sherbaniuk (2-0; 2-0)

Company Law—Unincorporated associations. Partnerships. Companies; incorporation under provincial and federal legislation; history of the rise of joint stock companies; the nature of a corporation; corporate criminal liability; the doctrine of *ultra vires;* the indoor management rule; company promotion; formalities of company contracts; capitalization of companies; membership in companies; rights and liabilities of shareholders; dividends; directors.

Gower, *Modern Company Law;* Alberta Partnership Act; Dominion Companies Act; Alberta Companies Act; Alberta Securities Act; Selected cases and readings.

Law 465—A. Smith (0-0; 2-0)

Conflict of Laws—Characterization. Domicile. Choice of law: Penal, revenue and procedural law, public policy; Marriage—form, capacity; Succession—moveables, immoveables; Restrictions on power of testamentary disposition; Revocation of a will by subsequent marriage; Proprietary rights of spouses; Legitimacy; *Legitimatio per subsequens matrimonium;* Adoption of infants; Torts; Contract. The doctrine of the *renvoi.* Jurisdiction: General; Divorce; Nullity of marriage; Custody of infants.

Castel, *Cases of the Conflict of Laws;* Falconbridge, *Cases on the Conflict of Laws;* Morris, *Cases on Private International Law;* Dicey, *The Conflict of Laws;* Cheshire, *Private International Law;* Falconbridge, *Essays on the Conflict of Laws;* Castel, *Private International Law;* Graveson, *The Conflict of Laws;* Wolff, *Private International Law.*

Law 466—D. T. Anderson (2-0; 2-0)

Jurisprudence—The philosophy of law, including the natural law, historical, positivist and sociological viewpoints. The analysis of law, including classification and sources, and legal concepts such as rights and duties, negligence, personality, property and possession. The study of law on the basis of interests. Paton, *Jurisprudence;* Friedmann, *Legal Theory;* Stone, *The Province and Function of Law;* Salmond, *Jurisprudence.*

Law 467—D. Sherbaniuk (2-0; 2-0)

Taxation—The scope and purpose of taxation. The taxing power: constitutional problems. Personal jurisdiction. Property jurisdiction. Statutory interpretation. Problems of death duty legislation. Gift tax. Income tax: general principle;income from services, property and business; deductions, receipt and measurement of income.

LaBrie and Sherbaniuk, *Cases and Material on Taxation;* LaBrie, *Introduction to Income Tax Law—Canada;* Dominion Succession Duty Act, Estate Duty Act, Income Tax Act.

Accounting 270—Percy Herring

Legal Accounting—The first portion of the course will cover the introduction to the principles and mechanics of accounting as required by the Alberta Bar Society covering accounts of practising lawyers. This will entail instruction in double entry bookkeeping principles, general maintenance of books for law offices, maintenance of books for recording of trust funds, control of disbursement of funds, and preparation of income and expense statements and balance sheets.

The second section of the course will include examination of the application of accounting principles in the various areas of income taxation, company and municipal law, management of estates, bankruptcy and winding up procedures.

Seminars

A number of seminars will be offered. Each student will enrol in one of them. Consideration will be given to the student's preference but allocation will be made if necessary to avoid large classes.

The exact number of seminars and the subject matter will be announced at registration time. The following seminars will be offered.

Law 490—A. Smith (1-0; 1-0)

Seminar in Advanced Problems in Constitutional Law—The purpose of this Seminar is to enable and require the participants to conduct intensive, specialized studies in topics in Canadian Constitutional Law which have current or future significance but which were either not treated or, if treated, not emphasized in the subject in the second year. Each participant, during the Session, will prepare, deliver and defend a major paper on a topic chosen by him and approved by the instructor. (Not offered in 1964-65)

Law 491—A. R. Thompson (1-0; 1-0)

Seminar in Problems in Oil and Gas Law—A study of legal problems relating to the nature of the interest in oil and gas in suit and under the various dispositions encountered in Canada; the rights and duties of the parties under the typical oil and gas lease; development obligations; the impact of legislation and particularly the *Oil and Gas Conservation Act.* Students are required to present papers on such legal problems. *References*: *Canadian Oil and Gas,* Lewis and Thompson; United States text books, reviews and cases; related statutes.

Law 492—Ivan Head (1-0; 1-0)

Seminar in International Law—A consideration of the sources of international law and its application in relationship between States. Problems involving nationality, territory and international trade will be discussed. Special attention will be given to the role of treaties and the work of international conferences. A paper will be required of each student.
Bishop: *Cases and Materials in International Law.*

Law 493—D. Sherbaniuk (1-0; 1-0)

Seminar in Estate Planning—A study of arrangements for the disposition of accumulated wealth during life and at death. Consideration is given to such factors as the impact of income, estate and gift taxes in shaping the form of dispositions, the function of life insurance in family and business arrangements, and the significance of variations in the disposer's family and business circumstances and in the nature and value of his assets.

Law 494—W. Angus (1-0; 1-0)

Seminar in Comparative Law—A comparison of civil law and common law systems with the Quebec example serving as the focal point for discussion and examination. The seminar concers itself with particular illustrations from which to draw general conclusions. Its object is to broaden the common law horizon by providing an insight into the workings of the civil law.
Castel, *The Civil Law System of the Province of Quebec.*

THE COMBINED COURSE OFFERED FOR THE DEGREES OF BACHELOR OF ARTS AND BACHELOR OF LAWS

First Year

English 200; French 200 or German 200 or Latin 200; a science or mathematics or statistics course; two of Economics 200, History 200, Philosophy 240 or Political Science 200; Physical Education.

Second Year

Five approved Arts courses (See "Notes" below.)
(No student may enter the second year of the combined course unless he has successfully completed the first with an average of not less than 60%.)

Third Year

The prescription for first year Law; one approved senior Arts course. (Promotion from the second to the third year of the combined course is contingent upon an average of at least 60% in the second year and second class standing in at least four courses, two of which must be in the second year. Students eligible to enter the third year will be notified by the Dean of Law.)

Fourth Year

The prescription for second year Law.
(The degree of B.A. may be granted at the end of the fourth year.)

Fifth Year

The prescription for third year Law.

Until his third year of the combined course, the student is under the jurisdiction of the Faculty of Arts. In the third year (his first year of Law) the student is primarily under the jurisdiction of the Faculty of Law but remains under the partial jurisdiction of the Faculty of Arts. Prospective Law students are invited to consult the Dean of the Faculty of Law for advice as to the selection of options or for advice on any other problem.

Notes on B.A.-LL.B. Course Selection

1. The courses of the first two years of the combined program must include a major concentration of three courses in one of Economics, English, History, Philosophy or Political Science, and a minor concentration of two courses in a second subject, not necessarily one of these.
2. The program must include at least one approved course in either Canadian History or Canadian Government, and at least one approved course in British Constitutional History or British Government; these courses may, but need not, be included in either the major or minor concentration.

XVI

The Faculty of Medicine

INFORMATION, REGULATIONS, COURSES

(1) INTRODUCTION

The Faculty of Medicine offers the following degree programs:

(a) **The program leading to the Degree of Doctor of Medicine (M.D.)**

The Faculty provides a complete and fully accredited four year medical training program leading to the Degree of Doctor of Medicine. Each year contains 33 weeks of instruction. The first two years are devoted to a study of the basic medical sciences and to an introduction to clinical medicine. The final two years, which are conducted on a quarter or trimester system, are devoted to clinical study and experience in the hospitals associated with the Faculty.

(b) **The Program leading to the Degree of Bachelor of Science in Medical Laboratory Science (B.Sc. (M.L.S.))**

The Faculty conducts a four year program leading to the Degree of Bachelor of Science in Medical Laboratory Science which is intended to qualify selected applicants for positions as Laboratory supervisors or senior technologists and to meet the special requirements of medical science laboratories. The third year of the program includes a 12 month period of practical laboratory training under the direct supervision of the Faculty of Medicine.

Students are eligible, at the end of the third year of the program, for the examinations of the Canadian Society of Laboratory Technologists.

(c) **A program leading to the Degree of Bachelor of Science in Medicine (B.Sc. (Med.))**

A one year program of study in a branch of medical science leading to qualification for the Degree of Bachelor of Science in Medicine may be undertaken either at the completion of the second year of the medical program or following graduation in medicine. The work for this degree may be carried out in any department of the Faculty of Medicine, but may not be taken concurrently with any part of the medical curriculum nor by a student carrying any condition in his medical program.

Further information may be obtained from the Dean of Medicine or the Registrar.

In addition to these degree programs the following programs are conducted:

(1) **Graduate Studies**

Programs leading to the degree of Master of Science or Doctor of Philosophy in any of the basic medical sciences and in most of the clinical medical sciences are conducted under the direction of the Faculty of Graduate Studies. These programs are open to graduates in medicine of this or any other approved medical school who conform to the requirements and regulations of the Faculty of Graduate Studies. See calendar of the Faculty of Graduate Studies.

(2) Graduate Training in Medical and Surgical Specialties

A graduate training program leading to eligibility for specialist qualification by the Royal College of Physicians and Surgeons of Canada is offered in most clinical specialties. The program is conducted under the direction of the Chairman, Committee on Graduate Training of the Faculty of Medicine, in hospitals and institutions affiliated with the Faculty.

(3) Continuing Medical Education

A program of postgraduate courses and hospital-based conferences for members of the medical profession practising in the Province of Alberta is conducted by the Director of Continuing Medical Education of the Faculty.

Students' Expenses

The four academic years in the M.D. course will necessitate, on the average, an estimated total expenditure by each student of approximately $7,000, including room and board. Annual costs will be roughly a quarter of the total amount, and students are urged to ensure the provision of adequate financial resources. Funds are available as loans and grants in case of need.

Medical Undergraduate Society

Upon the unanimous request of the students, the Board of Governors has authorized the collection of a fee from every student in Medicine for the Medical Undergraduate Society, by which such student acquires membership. The society looks after certain social and cultural activities for the medical students and represents them in various connections, including that of the Canadian Association of Medical Students and Internes.

The University of Alberta Hospital and Associated Hospitals

The University of Alberta Hospital, containing 1,200 beds, is used for clinical instruction and, by special arrangements, six other hospitals are also available for this purpose. These are: The Royal Alexandra Hospital (790 beds), the Misercordia Hospital (425 beds); the Edmonton General Hospital (530 beds); the Charles Camsell Hospital; the Ponoka Mental Hospital, and the Aberhart Memorial Sanatorium.

University of Alberta Cancer Research Unit

Established in cooperation with the Canadian Cancer Society and the University, the Unit is housed in the Dr. John S. McEachern Cancer Research Laboratory. It is one of four such units located by the National Cancer Institute in Canadian medical schools.

Several postdoctoral research fellowships, for which application may be made to the Director, will be available each year.

Requirements for License to Practise.

After graduates of the University of Alberta have satisfactorily completed a year's interneship in a hospital approved by the faculty, they are entitled to be licensed by the College of Physicians and Surgeons of this province without further examination and are eligible for provincial registration. To become

licensed in any other province of the Dominion, it is necessary, however, either to write the provincial examinations of the licensing body in the province concerned or to gain the qualification of the Medical Council of Canada. The latter carries the right to register in any province provided all the educational requirements of the licensing body of that province are met and to register with the General Medical Council of the United Kingdom.

The Medical Council of Canada holds its examinations at the University of Alberta at specified times. These examinations are held as conjoint examinations with the fourth year final examinations of the Faculty.

The Council of the Faculty of Medicine annually issues a list of hospitals at which an Internship satisfactory to the Council may be served. Copies of this list will be distributed to the graduating class and may be obtained from the Office of the Dean of Medicine. Graduates of the Faculty, who do not intern at hospitals on this list, may not be recommended for an Enabling Certificate.

For full particulars in regard to these examinations, consult the Registrar of the College of Physicians and Surgeons of Alberta.

Students who wish to take the examinations of the National Board of Medical Examiners of the United States may take the Part I examination at the end of the second year of the undergraduate program and the Part II examination at the end of the fourth year.

Registration for Practice

The holder of a license to practice must register with the professional organization in the particular province concerned. In Alberta, this is the College of Physicians and Surgeons of the Province of Alberta; for information regarding provincial registration address the Registrar of the College, Dr. W. Bramley-Moore, Edmonton, Alberta. Students who intend to practise in any other province should secure information from the provincial body concerned as early as possible in their medical course so that they may know of any special educational conditions which must be fulfilled.

Educational Register

All graduates serving an internship in the Province of Alberta are required, by provincial legislation, to be registered on the Educational Register of the College of Physicians and Surgeons of Alberta. This registration permits the practice of medicine within the hospital designated on the registration. Graduates serving as hospital residents in Alberta who are not registered practitioners in the Province are similarly required to be registered on the Educational Register. Application should be made to the Registrar, College of Physicians and Surgeons of Alberta from whom full particulars may be obtained.

(2) ADMISSION REQUIREMENTS

M.D.

The basic requirement for admission to the Faculty of Medicine is the satisfactory completion (after senior matriculation) of at least two years of university work approved by the Medical Faculty, including full university courses in organic chemistry, inorganic chemistry, physics and zoology (or biology).

Although these four science courses are prerequisites for entrance into the Medical Faculty no special consideration will be given to applicants having other science courses. All students are urged to take the program that they find most interesting, that will still give them these prerequisites.

The requirements can be met in various degree patterns in different faculties.

For information, the Registrar should be consulted.

Owing to limited facilities for instruction it has been found necessary to restrict the number of candidates accepted for entrance into the first year of medicine. Consideration for admission under this quota will be given only to those students who have an over-all average of at least 65% in the work of all preceding university years. While admission to Medicine is based largely on academic standing, the lack of essential personal qualities in an applicant may be deemed sufficient cause for refusal of admission. It should be further noted that any student whose work is unsatisfactory to the Faculty will not be permitted to continue in the study of medicine.

All students who wish to enter the first year of Medicine are required to make application to the Registrar on or before April 1. It is desirable that candidates should arrange a personal interview with the Dean or his appointee. Students wishing to apply for admission to the Faculty of Medicine for September 1965 are required to take the Medical College Admission Test which will be given at the University of Alberta in October 1964 and April 1965. Notices concerning applications to take this test will be posted early in the fall term.

All successful applicants are required upon acceptance of a position in first-year Medicine to make a deposit of $25.00 to the Bursar of the University. This deposit will be applied on first-year fees when the student registers in the ensuing term. Should a candidate withdraw after once accepting a position this deposit will be forfeit.

B.Sc. (M.L.S.)

The requirements for admission are as follows (students from outside Alberta must satisfy the Registrar that their training is equivalent to that required of Alberta students):

(a) A High School Diploma with

(b) "B" or higher standing in the following Grade XII examination subjects:

1. English 30
2. Social Studies 30
3. Mathematics 30
4. Chemistry 30
5. & 6. Two of
   - Physics 30
   - Biology 30 (Biology 32 will be accepted in lieu until and including September 1965)
   - French 30 or German 30 or Latin 30 (or another language at equivalent level)

(c) an average in these courses of at least 60%.

(d) Candidates must have satisfactory personality and physique and must

meet the health and physical requirements of the University of Alberta Health Services.

(e) All candidates are required to have a personal interview before their application can be considered complete.

Owing to limited facilities for instruction it has been found necessary to restrict the number of candidates accepted for entrance into the first year of the program.

A fee of $5.00 is charged for evaluation of documents issued by Canadian educational institutions outside Alberta and a fee of $10.00 for documents issued by educational institutions outside Canada.

General

These general regulations nothwithstanding the University may in its discretion refuse admission to any applicant. For example this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

(3) PROMOTION AND GRADUATION

Examination Results

The Council of the Faculty of Medicine approves the principle that the means of assessing a student's progress and the determining of grades may vary from one department to another according to the type and nature of the course. Factors other than examination results may be used to a variable extent by instructors in determining grades but students will be informed at the commencement of the course that such measures will be employed.

First-class standing: 80% or over.
Second-class standing : 65% to 79%.
Third-class standing: 50% to 64%.
Pass marks: 50% in each subject. A general average of 60% is required for students in the M.D. and B.Sc. (M.L.S.) programs.

For the purpose of reaching an average mark in the work of each year in the M.D. course a scheme for determining a weighted average has been adopted. A notice outlining the basis on which this is done will be posted during the session.

Supplemental Examinations

(a) Supplemental examinations for M.D. students are conducted by the University in August of each year and for B.Sc. (M.L.S.) students in September. A student who has failed any course in the preceding session and who has been granted a supplemental examination may apply to the Registrar not later than the specified date for permission to write it.

M.D.:

Under no circumstances will any student who has written final examinations be permitted to sit for a supplemental examination unless he has attained an average of at least 60% on the year's work including the failed subject or subjects. Any student neglecting to take or failing to pass a supplemental examination will not be allowed to proceed.

B.Sc. (M.L.S.):

Failure to pass a supplemental examination will necessitate repeating either that course or the whole year at the discretion of the Faculty Council.

(b) **Pass mark:** The pass mark for supplemental examinations is 50% in all courses.

(c) **Illness:** A student who has missed a final examination because of illness may apply (providing that the application is supported by a satisfactory medical certificate) for a deferred final at the time set for the supplemental examinations in his course. A student who cannot take a Christmas final examination because of illness will be granted a deferred final examination at the end of the session; application for such an examination must be made not later than March 29.

Promotion, M.D. Course

Because facilities for instruction are limited it is necessary to ensure that no unsatisfactory student shall usurp a place that could be filled by a deserving one; consequently no one will be allowed to repeat the first year of medicine unless under special circumstances deemed adequate by the Faculty. Moreover, to maintain a proper standard, a student will not be allowed to proceed to any subsequent year of medicine untill his present year is fully completed with an average mark of at least 60%.

A student permitted to repeat a failed year who fails to produce a satisfactory record in his first term examinations in the repeated year will be required to withdraw from the Faculty and will be denied further registration in the Faculty.

Except in very unusual circumstances a student, who is repeating either first or second year of the Medical Faculty, will be required to withdraw unless his over-all average in the repeat year is at least 65%.

Requirements for Graduation, M.D. Course

The course leading to the degree of M.D. involves four years of study in the Faculty of Medicine, following which a twelve-month period of interneship must be served in an approved hospital.

To receive the degree of Doctor of Medicine, a student must be at least 21 years old and of good moral character. At least the fourth academic year of medical study must have been spent at this University and all university dues must have been paid. In addition to complying with the requirements for admission and completing the required work of the curriculum, each candidate for the degree of Doctor of Medicine must have been recommended to the General Faculty Council for graduation. The University reserves the right to withhold the granting of the degree of M.D. until the required period of interneship has been completed and approved.

Requirements for graduation include moral and personal as well as educational qualifications, and completion of the formal requirements does not necessarily entitle a candidate to a degree from the University of Alberta. The Faculty bases its recommendations on considerations of character and of ability, attainment and worthiness in general, as well as on the completion of the required subjects in the curriculum.

(4) GRADUATE STUDY

Degree of M.Sc. or Ph.D.

By enrolling in the Faculty of Graduate Studies, a medical student holding the dgeree of B.A. or B.Sc., or a graduate in Medicine, may take special work in a branch of medical sciences to qualify for the degree of M.Sc. or Ph.D. See the Calendar of the Faculty of Graduate Studies.

Research

The laboratories of the basic science and clinical departments are open to those who are qualified to undertake investigations. Qualified students may work toward the degrees of B.Sc., M.Sc., or Ph.D. in these subjects. Due to limitation of facilities, such cases will be decided in the light of circumstances at the time. For further information, apply to the head of the department concerned.

(5) PROGRAMS OF STUDY AND DETAILS OF COURSES

The Program Leading to the Degree of Doctor of Medicine

(Details will be found under departmental headings.)

FIRST YEAR

Subjects		Total Hours of Instruction
Gross Anatomy and Development	Anat. 411	350
Histology and Neuroanatomy	Anat. 413	250
Biochemistry	Biochem. 411	198
Physiology	Physiol. 411	275
Orientation to Medical Practice	Orient. to Med. Prac. 411	66
	Total	1139

SECOND YEAR

Subjects		Total Hours of Instruction
Anthropology	Anat. 421	15
Applied Anatomy	App. Anat. 421	82
Bacteriology	Bact. 421	198
Biochemistry (clinical)	Biochem. 421	45
Clinical Pathology	Clin. Path. 421	66
Intro. to Med.	Intro. Med. 421	326
Obstet. and Gynaecology	Obst. & Gyn. 421	33
Pathology	Path. 421	198
Pharmacology	Pharmacol. 421	165
Paediatrics	Paed. 421	12
	Total	1140

THIRD YEAR

Subjects		Total Hours of Instruction
Medicine	Clin. Med. 431	240
Obstetrics and Gynaecology	Obst. & Gyn. 431	66
Ophthalmology	Ophth. 431	16
Oto-Laryngology	O.L. 431	16
Pathology	Path. 431	114
Paediatrics	Paed. 431	210
Preventive Medicine	Prev. Med. 431	50
Radiology	Rad. 431	32
Surgery	Clin. Surg. 431	275
Survey of Disease	Surv. Dis. 431	256
	Total	1275

FOURTH YEAR

Subjects		Total Hours of Instruction
Anaesthesia	Anaesth. 441	34
Medicine	Clin. Med. 441	356
Medical Jurisprudence and Toxicology	Med. Jur. & Tox. 441	22
Medical Economics and Ethics	Med. Econ. & Eth. 441	11
Obstetrics and Gynaecology	Obst. and Gyn. 441	186
Ophthalmology and Oto-Laryngology	Ophth. and O.L. 441	32
Pathology	Path. 441	33
Paediatrics	Paed. 441	64
Preventive Medicine	Prev. Med. 441	30
Psychiatry	Psych. 441	186
Radiology	Rad. 441	34
Surgery	Clin. Surg. 441	256
Therapeutics	Therap. 441	33
	Total	1277

Details of Courses Leading to the Degree of Doctor of Medicine

Note: The total hours of instruction in a course are shown at the top of each course description. Since the times devoted to lectures, clinics, demonstrations and conferences will vary, no attempt has been made to break down the overall figure.

The trimester system and clinical clerkships will begin in third year. A clerkship will consist of bedside clinics, small group teaching, and the assigning of individual cases which the students must work up for themselves.

The trimesters will be divided for clerkships as follows:—

THIRD YEAR (each week contains 26 hours devoted to clerkship)

1st Trimester

Medicine—11 weeks

2nd Trimester

Surgery—11 weeks

3rd Trimester
Paediatrics—8 weeks
Obstetrics—3 weeks

FOURTH YEAR (each week contains 34 hours devoted to clerkship)

1st Quarter
Medicine—8 weeks

2nd Quarter
Surgery—8 weeks

3rd Quarter
Obst. and Gyn.—4 weeks
Paediatrics—4 weeks

4th Quarter
Medicine—4 weeks
Psychiatry—4 weeks

General Courses

The following courses are given by two or more departments in co-operation with each other, under the general direction of the curriculum committee.

Orientation to Medical Practice 411 (first year) (2-0; 2-0)

S. Greenhill (Coordinator)
K. Yonge, L. Judge, and S. Smith

This course is designed to acquaint first year students with the inter-relationships of the medical, behavioural and basic sciences in the production of signs, symptoms and feelings in a patient. The lectures are given by members of the various basic science and clinical departments, as well as representatives from the behavioural sciences. Major divisions are Psychiatry, Human Genetics and Biostatics.

Introduction to Medicine 421 (Second Year) (326 hours)

A. S. Little, Coordinator

A series of lectures, theatre clinics, and bedside sessions to introduce the student to broad principles underlying disease, to the interpretation of symptoms and symptom complexes, both physical and emotional, and to attempt to demonstrate a close relationship between the two.

Survey of Human Disease 431 (Third Year) (256 hours)

L. E. McLeod, Coordinator

"Case centred" presentations designed to cover, in general, those diseases usually covered by departments of Surgery, Medicine, Paediatrics, and Psychiatry.

Applied Anatomy 421 (second year) (82 hours)

H. L. Richard and H. E. Duggan

This course gives the various aspects of Radiological and Surgical Anatomy divided as follows:—

Radiology will consist of weekly lectures in normal radiographic anatomy for one term. The second term will cover radiobiology including vairous types of radiation, production of x-rays, radiation effects, the theory of the

atom, radioactive isotopes and radiation hazards; also covered will be the radiographic appearance of pathological lesions of all systems of the human body.

Surgical anatomy will consist of lecture-demonstrations by members of the department of surgery. Emphasis on surgical exposures, anatomical regions of surgical importance, and the applied anatomy of standard surgical techniques.

Courses by Departments

ANAESTHESIA

This department takes part in the teaching exercises in the Introduction to Medicine and Survey of Disease courses.

STAFF:—

Professor—E. A. Gain (Head)
Assistant Professors—D. F. Cameron, F. C. Haley, J. W. McIntyre, J. W. Ransome
Lecturer—N. W. Nix
Instructors—W. H. Graham, G. T. Moonie
Honorary Instructors—C. D. Elton, W. D. Kyle, R. I. McCalla
Honorory Sessional Instructor—J. W. Hagen

Anaesthesiology 441 (fourth year) (34 hours)

One week of training in the operating room and in discussions with members of the staff of Anaesthesiology. This will be given during the Medicine Quarter.

ANATOMY

This department takes part in the courses in Introduction to Medicine and Survey of Disease.

STAFF:—

Professors Emeritus—H. E. Rawlinson, R. F. Shaner
Professors—T. S. Leeson (Head), W. R. Salt
Associate Professors—E. G. Bertram, R. D. Laurenson
Assistant Professors—R. J. Bury, N. Cameron, L. B. Erikson, E. Odette Hagen
Sessional Demonstrators—K. L. Bowes, H. T. Ross
Honorary Instructor—K. A. McMurchy
Honorary Members—L. Heppler, N. J. Minish, G. H. Sperber

Anatomy 411—R. D. Laurenson and Staff (350 hours)

Gross Anatomy and Development (first year)—Gross anatomy and embryological development of the human body.

Anatomy 413—W. R. Salt and Staff (250 hours)

Microscopic Anatomy (Histology and Neuroanatomy) (first year)—The minute anatomy and development of the elementary tissues and organs (about 150 hours) and the structure of the human nervous system and organs of special sense (about 100 hours).

Anatomy 421—R. F .Shaner (15 hours)

Anatomy (second year, Anthropology)—A brief survey of ancient man and the anatomical evidence of man's place in nature.

Prerequisite: Anatomy 411 or 412.

BACTERIOLOGY

The department of Bacteriology takes part in the presentations in the Introduction to Medicine and Survey of Disease courses.

STAFF: —

Professor and Head of Department—R. D. Stuart
Professor—E. J. Penikett
Associate Professors—J. W. Carmichael, J. I. Payne
Assistant Professors—Anne M. Bursewicz, Sheila Toshach, Odosca Morgante
Sessional Lecturer—S. I. Hnatko
Sessional Instructor—Yvonne Goodman

Bacteriology 421—R. D. Stuart, O. Morgante and Members of the Department (198 hours)

Pathogenic Bacteriology (second year)—The relation of bacteria, viruses, fungi and protozoa to disease. Bacteriological procedures applicable to the diagnosis, control and treatment of infectious disease.

Bacteriology 431—S. I. Hnatko, A. M. Bursewicz (100 hours)

Bacteriology—Introductory Course—Specifically for certain groups of nurses. (Two Courses—50 hrs, each term.)

Bacteriology 403—J. W. Carmichael (3-0; 0-0) or (0-0; 3-0)

Microbial Taxonomy—A study of the history, principles and methods of microbial classification and nomenclature.
Prerequisite: Microbiology 360 or Botany 330 or 340, or consent of instructor.

BIOCHEMISTRY

STAFF: —

Professors—J. S. Colter (Head), H. B. Collier, A. R. P. Paterson
Associate Professors—C. M. Kay, B. G. Lane, N. B. Madsen, G. R. Schonbaum, L. B. Smillie, J. F. Henderson, A. Hampton
Assistant Professors—Edith E. Townsend, W. Paranchych, D. J. Campbell
Instructors—L. E. McLeod, A. G. Stewart, H. E. Bell, Joan E. Dakin
Postdoctoral Fellows—J. A. Verpoorte, V. T. Maddaiah

Biochemistry 411—Members of Staff (198 hours)

General Course (first year)—Structure and chemistry of the cell; acidimetry and alkalimetry; chemistry of carbohydrates, lipids, proteins and nucleic acids; enzymes; bioenergentics; digestion, absorption and intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids; mineral metabolism; vitamins; blood chemistry; chemistry of respiration.
Prerequisites: Chemistry 230, Chemistry 250.

Biochemistry 421—H. B. Collier and L. E. McLeod (45 hours)

Clinical Biochemistry (second year)—The lectures deal with a few selected topics in biochemistry. Case reports are presented and discussed. The laboratory work includes: routine chemical examination of urine; quantitative analysis of blood. Tht object of the course is to illustrate the application of principles and methods of the basic sciences to clinical problems.

MEDICINE AND CLINICAL MEDICINE

The Department of Medicine takes a major share of the teaching in the courses on Introduction to Medicine and Survey of Disease. The formal presentations by this department are largely limited to these courses.

STAFF:—

Professors—D. R. Wilson (Head), R. S. Fraser, J. A .L. Gilbert

Associate Professors—L. E. McLeod, G. Monckton

Assistant Professors—A. S. Little, R. E. Rossall, B. J. Sproule

Clinical Professors—J. F. Elliott, R. K. C. Thomson

Associate Clinical Professor—R. H. Whiting

Assistant Clinical Professors—J. Dvorkin, J. R. Hilliard, D. C. L. Judge, F. B. Rodman

Lecturers—G. I. Bell, W. Bramley-Moore, A. Cairns, E. F. Donald, R. H. Dougall, A. M. Edwards, S. E. Greenhill, E. G. Kidd, C. Lefebvre, M. Matas, J. M. Ryan, M. M. Sereda, L. Sherman, H. H. Stephens, M. K. Young

Instructors—T. H. Aaron, D. M. Bell, G. D. Brown, V. J. Campbell, R. B. Coglan, W. J. Downs, R. N. Eidem, F. A. Herbert, J. C. Hopkyns, S. Kornell, C. G. Ramsay, R. W. Sherbaniuk, W. R. St. Clair, H. Toupin, C. J. Varvis, S. Weisz, R. H. Wensel

Sessional Instructors—W. R. Black, P. C. M. Mendes

Honorary Instructor—W. E. Pourbaix

Teaching Fellows—J. A. R. Holmes, M. Sanderson

Research Associate—T. P. Broome

DERMATOLOGY

Assistant Clinical Professor—P. L. Rentiers

Lecturer—A. E. Dixon

REHABILITATION MEDICINE

Assistant Clinical Professor—M. T. F. Carpendale

Honorary Lecturers—J. C. Parish, J. Jiminez

THERAPEUTICS

Assistant Professor—M. A. Mahon

Instructor—J. R. Hilliard

Honorary Members—A. F. Anderson, R. E. Bell, P. H. Sprague

Med. and Clin. Med. 431—D. R. Wilson and Staff (240 hours)

Medicine (third year)—A large portion of the Survey of Disease course will be given by the department of Medicine. Besides this the student will have a clerkship of 11 weeks in which he will do complete case history, physical examination, laboratory work and follow-up on assigned cases. There will also be bedside clinics, conferences and case presentations by the students.

Med. and Clin. Med. 441—D. R. Wilson and Staff (356 hours)

Medicine (fourth year)—This is primarily a Clinical Clerkship of 12 weeks in various Edmonton Hospitals and in the outpatient department. An additional 16 hours is devoted to a reading course in this subject.

Med. and Clin. Med. 441—W. Bramley-Moore (11 hours)

Medical Economics and Ethics (fourth year)—A short series of lectures devoted to these topics is given under the direction of the department of Medicine.

Med. and Clin. Med. 441—W. A. Mahon

Therapeutics—A series of lectures on the therapy of various disease states will be given to students in their final year.

OBSTETRICS AND GYNAECOLOGY

STAFF:—

Professor Emeritus—J. R. Vant
Honorary Clinical Professor—A. Day
Professor—W. M. Paul (Head)
Associate Professor—J. W. Goodwin
Assistant Professor—W. F. Ferguson
Clinical Professor—R. H. Horner
Clinical Associate Professors—T. R. Clarke, T. R. Nelson
Assistant Clinical Professors—W. D. Frew, M. M. Hutton, S. S. Parlee, D. C. Ritchie, Y. Yoneda
Lecturers—D. M. Bell, J. A. Boyd, J. Bugis, E. B. Quehl
Instructors—J. S. Barr, L. B. Brown, O. Buchanan, H. J. Crooks, R. A. Day, S. Devine, F. R. J. Dorsey, L. J. Gans, D. H. Husel, J. R. Leeder, R. J. Ostolosky, D. W. J. Reid
Honorary Sessional Instructors—D. J. Moyer, N. W. F. Weir
Teaching Fellow—T. B. MacLachlan

Obst. and Gyn. 421—W. M. Paul and Staff (33 hours)

Obstetrics and Gynaecology (second year)—This course embodies lectures in the physiology and conduct of normal pregnancy and labour, as well as an introduction to gynaecology.

Obst. and Gyn. 431—W. M. Paul and Staff (66 hours)

Obstetrics and Gynaecology (third year)—The material for this course includes the complications of pregnancy, labour and the puerperium, as well as an expansion of clinical gynaecology, and a course in gynaecological pathology. Throughout the year, small groups of students are assigned to an obstetrical tutor. These groups meet their tutor weekly, in order to cover the curriculum, which is supplemented by formal lectures.

During each trimester, students will be assigned almost completely to the department for a period of three weeks. They will "live in" during ten days of this period. While on the service, their tutor will act as the attending staff man on the public service. This is designed to afford a continuing contact between the students and their tutor.

Obst. and Gyn. 441—W. F. Ferguson and Staff (186 hours)

Obstetrics and Gynaecology (fourth year)—No formal lectures are given in fourth year. Each student will act as a Clinical Clerk for a period of four weeks and will "live in" for two weeks of this time. Daily small group teaching sessions are arranged. They will attend the Out Patient Clinics in small groups during this period. A Reading Course is held on alternate Saturday mornings throughout the year.

PAEDIATRICS

The Department of Paediatrics contributes to the teaching in Orientation to Medical Practice, Introduction to Medicine, and Survey of Disease Courses as well as conducting the following teaching exercises.

STAFF:—

Professor—J. K. Martin (Head)
Associate Professors—P. Bowen, A. G. Stewart, W. C. Taylor
Clinical Professor—J. Calder
Associate Clinical Professors—T. A. Gander, K. A. Swallow
Assistant Clinical Professors—H. B. Armstrong, L. C. Grisdale, N. F. Duncan
Lecturers—L. E. Beauchamp, R. Poirier
Instructors—G. Conradi, G. E. Eddy, R. Gobius, P. J. Kimmitt, Jean C. Nelson, G. W. Selby, M. Tedeschini
Sessional Instructors—D. Wilkinson, E. J. Turner
Teaching Fellow—M. T. S. Parand

Paediatrics 421 (12 hours)

Paediatrics (second year)—An introduction to Paediatrics.

Paediatrics 431—J. K. Martin and Staff (176 hours)

Paediatrics (third year)—There is a clerkship of 176 hours in which the student will be assigned cases on which he must do a complete history, physical examination and laboratory work and be prepared to present his case at any time. During this time there will also be bedside clinics and conferences.

Paediatrics 441 (128 hours)

Paediatrics (fourth year)—During a four week clerkship in Paediatrics students will be given some patient responsibility and be under the guidance of a Preceptor.

PATHOLOGY

STAFF:—

Professor—J. W. Macgregor (Head)
Associate Professors—G. O. Bain, S. Hanson, T. A. Kasper, T. K. Shnitka, R. J. Swallow
Assistant Professors—P. W. Davey, B. Mielke, M. M. Sereda
Clinical Professor—M. Weinlos
Assistant Clinical Professors—M. M. Cantor, D. C. L. Judge
Honorary Member—M. E. Hall

STAFF:—(CLINICAL PATHOLOGY)

Associate Professor—R. E. Bell
Assistant Professor—H. E. Bell
Instructors—D. I. Buchanan, J. Matheson (Co-ordinator, M.L.S. Program)
Sessional Instructor—B. Motyl
Sessional Demonstrators—D. Newson, Mrs. L. Bradley, L. Mueller, A. Eaton

Pathology 421—J. W. Macgregor and Staff (198 hours)

General Pathology (second year)—This course consists of lectures and laboratories for the full academic year. The fall term is devoted to general path-

ology, and the spring term to special pathology. The teaching of special pathology will be continued into the third year.

Pathology 431—J. W. Macgregor, M. Weinlos and Staff (114 hours)

Pathology (third year)—A series of lectures on pathological change in special organs and tissues with concurrent laboratory demonstrations of gross and microscopic pathological material.

Pathology 441—J. W. Macgregor and Staff (33 hours)

Pathology (fourth year)—Students will attend a clinical-pathological conference, conducted under the supervision of the Department of Pathology, for one hour each week.

Pathology 441—M. M. Cantor (22 hours)

Medical Jurisprudence and Toxicology (fourth year)—One hour per week for twenty-two weeks dealing with the criminal and civil aspects of legal medicine, and with the action of poisons.

Pathology 421—R. E. Bell, H. E. Bell, D. I. Buchanan, D. Newson, B. Motyl (1-0; 1-2)

Clinical Pathology (second year)—Lectures in the selection, use and interpretation of laboratory examinations in clinical diagnosis. Hemopoietic system and kinetics of hemopoietic cell development. Study of hematological and other methods used in the clinical laboratory. Blood transfusion. Elementary helminthology.

PHARMACOLOGY

This department takes part in the teaching exercises in the Introduction to Medicine and Survey of Disease courses.

STAFF:—

Professors—E. E. Daniel (Head), C. W. Nash
Associate Professors—W. A. Mahon, G. S. Marks
Assistant Professors—D. F. Cameron, J. D. Taylor
Lecturer—D. P. MacLeod
Instructors—R. I. McCalla, Joan Morrison
Demonstrator—J. W. McIntyre
Honorary Member—R. D. Scragg

Pharmacology 421—E. E. Daniel, C. W. Nash, J. D. Taylor, W. A. Mahon, G. S. Marks and Staff (165 hours)

Pharmacology (second year)—A course on the pharmological action of drugs selected for their physiological and clinical significance. The course includes a study of basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs studied include general and local anaesthetics; hypnotics, sedatives and anti-convulsants; analgesics; central nervous system stimulants; autonomic and curariform drugs; histamine and antihistaminics; cardiovascular drugs; diuretics; heavy metals and their antagonists; haemostatic agents and anticoagulants; chemotherapeutic agents. This course also includes a series of lectures on prescription writing. Instruction is given in the form of lectures, demonstrations,

laboratory exercises and supervised original work. Written reports covering original work are required.

Textbooks: Goth, *Medical Pharmacology;* Goodman and Gilman, *The Pharmacological Basis of Therapeutics*, 2nd Edition.

PHYSIOLOGY

This department takes part in the teaching exercises in the Introduction to Medicine and Survey of Disease courses.

STAFF:—

Professor—J. W. Pearce

Associate Professors—K. M. Chapman, W. H. Cottle, C. Heath, E. O. Höhn, D. Triantaphyllopoulos

Assistant Professors—C. M. Feldherr, Ruth M. Henderson, P. F. Mercer

Lecturers—Merva K. Cottle, Mary Nursall

Instructor—R. H. Wensel

Demonstrators—Constance H. Campbell, C. Marie Fuller

Sessional Demonstrators—G. Drummond, Ruth Pankhurst

Teaching Fellows—K. N. Ackles, W. Fox, J. Pankhurst

Research Associates—Eugenie Triantaphyllopoulos, D. Triantaphyllopoulos, K. Zachariah

Honorary Members—J. F. Alexander, Ailene B. Feldherr, F. Haley, R. D. Haryett, T. J. Speakman

Physiology 411—J. W. Pearce, E. O. Höhn, C. Heath, K. M. Chapman and Staff (275 hours)

Physiology (first year)—The course consists of two parts. The first, largely given in the first term, comprises a study of basic physiology of cells and tissues, the circulatory, digestive and respiratory systems, and the phenomena of digestion, adsorption, metabolism and excretion. The second part, given largely in the second term, comprises the physiology of nerves and synapses, muscle, spinal reflex systems, brain centres and tracts, the special senses, the autonomic nervous system and aspects of behaviour. The endocrine glands, reproduction and temperature regulation will also be considered in the second term.

The course content is presented in lectures, demonstrations and laboratory exercises. Clinical demonstrations are included.

PREVENTIVE MEDICINE

The department of Preventive Medicine contributes to the teaching exercises of the clinical departments, and in the Orientation to Medical Practice, Introduction to Medicine and Survey of Diseases courses. The psycho-social, economic and preventive aspects of disease are discussed formally in lectures, and informally in seminars.

STAFF:—

Professor—Stanley Greenhill (Head)

Lecturers—H. L. Hogge, E. S. O. Smith

Instructors—P. B. Rose, W. G. McPhail, T. R. Hamilton, B. Snell, K. Wass, J. O'Brien

Sessional Instructors—M. Brand, M.D., N. Chepeha, M.A., E. Haynes, M.D., C. Hergott, M.D., A. Keleman, M.D., J. Lauerman, M.D., A Lloyd, M.D., D. MacPhee, M.D., D. McAlpine, M.D., W. Yake, M.D.

Preventive Medicine 431 (50 hours)

Preventive Medicine (third year)—(a) A lecture course designed to outline the administration, function, and role of a Department of Public Health in the practice of preventive medicine. (36 hours)

(b) Lectures in Population Trends, Epidemiology of Non-Communicable Diseases and Occupational Health. (14 hours)

(c) Family Study programme—a learning experience designed to acquaint the student with the psychological and economic factors contributing to the illness of his patient and/or family. Each student is assigned a family from the private practice of city practitioners.

Preventive Medicine 441 (16 hours)

Preventive Medicine (fourth year)—(a) Contemporary Society—a course designed to indicate the role played by psycho-social-economic factors in the production of today's morbidity.

(b) Medical Care—lectures designed to acquaint students with changing patterns of medical care.

PSYCHIATRY

STAFF:—

Professor—K. A. Yonge (Head)
Associate Professor—W. Forster
Assistant Professors—J. A. Easterbrook, J. T. Gibbs, T. E. Weckowicz
Clinical Professor—S. Spaner
Assistant Clinical Professors—J. Guild, A. D. MacPherson, T. C. Michie, A. R. Schrag
Lecturer—L. J. le Vann
Instructors—G. D. Carson, Mary A. Davis, F. J. Edwards, H. Fuerst, H. Pascoe, D. L. Phillips, Z. Selinger, H. Wojcicki
Honorary Member—R. R. MacLean

Psychiatry 411—K. A. Yonge and Staff (32 hours)

Psychiatry (first year)—Lectures introductory to psychiatry, medical psychology, sociology and anthropology together with an outline of the psychology of human development are given within the framework of the integrated course "Orientation to Medical Practice."

Psychiatry 421—K. A. Yonge and Staff (128 hours)

Psychiatry (second year)—Lectures in the psychodynamic mechanisms of personality, normal and pathological, the structure, function and assessment of personality, the principles and practice of interviewing and psychotherapy are given within the framework of the general course "Introduction to Medicine."

Psychiatry 431—K. A. Yonge and Staff (70 hours)

Psychiatry (third year)—48 hours of lecture demonstrations on the nature, cause and treatment of neurotic, psychotic and character disorders are given in the general course "Survey of Human Disease". In addition, experience in the diagnosis and treatment of disorders of personality is offered through small group clinics (22 hours).

Psychiatry 441—K. A. Yonge and Staff (136 hours)

Psychiatry (fourth year)—Experience in the clinical practice of psychiatry is gained through a one month's clinical clerkship, two weeks of which are spent at the University Hospital Department of Psychiatry and two weeks at one of the Provincial Mental Hospitals.

Textbooks:

Mowbray and Roger, *Psychology in Relation to Medicine;* Noyes and Kolb, *Modern Clinical Psychiatry,* 6th edition; Mayer-Gross, Salter and Roth, *Clinical Psychiatry;* Weiss and English, *Psychosomatic Medicine;* Gregory, *Psychiatry—biological and social;;* Engel, *Psychological Development in Health and Disease.*

RADIOLOGY

STAFF:—

Professor—H. E. Duggan (Head)
Assistant Clinical Professor—C. F. Hyndman
Lecturers—R. M. Clare, I. D. Hendin, M. Mallet, S. C. Windle
Instructors—C. E. Holmes, J. D. R. Miller, R. G. Moffat, W. R. Parker, M. E. Tulloh

Radiology 421—H. L. Richard and H. E. Duggan (68 hours)

Applied Anatomy (second year)—For details, see General Courses.

Radiology 431—H. E. Duggan and Staff (32 hours)

Radiology (third year)—The course consists of weekly lectures and demonstrations to students in each of the Surgical, Medical and Paediatric Trimesters.

Radiology 441—H. E. Duggan and Staff (34 hours)

Radiology (fourth year)—Weekly lectures and demonstrations on radiological findings in the various diseases and pathological conditions will be given to the whole fourth year class.

SURGERY AND CLINICAL SURGERY

In the first year of the course representatives of the Department of Surgery are in attendance at the laboratory periods in Anatomy and Physiology in order that the application of these subjects to clinical surgery may be indicated.

In the second year of the course the Department of Surgery, including the Surgical Specialties, in association with the other clinical and preclinical departments, contributes to the integrated panel discussions and illustrative case demonstrations which constitute the course "Introduction to Medicine". This course consists of two two-hour presentations per week throughout the year. In this year also the department takes part in Applied Anatomy 421.

STAFF:—

Professors—W. S. Anderson, R. C. Harrison, R. A. Macbeth (Head), W. C. MacKenzie
Clinical Professors—B. Michalyshyn, M. Weinlos, G. L. Willox, T. S. Wilson
Assistant Clinical Professors—W. F. M. Hall, A. W. Hardy, R. J. Johnston, S. Kling, A. B. McCarten, H. L. Richard, H. T. G. Williams
Lecturers—C. A. Allard, J. D. M. Alton, E. Hitchin, M. M. Laskin, W. A. Maclean, W. A. Shandro, A. E. Theman, C. H. W. Weinlos

Instructors—E. S. Allin, M. Besney, G. R. Boileau, R. G. Davis, H. A. Hyde, B. D. Margolus, W. A. Strutz

Sessional Instructors—G. E. Allin, E. W. Bissell, G. F. Bondar, M. H. W. Friedman, H. D. Hebb, R. E. Jesperson, M. W. Little, W. Pisesky, H. J. Shimizu, J. Siegenberg

(Experimental Surgery)
Associate Professor—K. P. Kowalewski
Consultant Pathologist—T. A. Kasper

(Neurosurgery)
Clinical Professor—G. K. Morton
Assistant Clinical Professor—T. J. Speakman
Sessional Instructor—P. B. R. Allen

(Ophthalmology)
Clinical Professor—
Associate Professor—T. A. S. Boyd
Lecturer—D. L. Rees
Sessional Instructors—A. Patrick, D. T. R. Hassard

(Orthopaedic Surgery)
Clinical Professor—O. Rostrup
Lecturers—G. W. Cameron, F. G. Day, D. C. Johnston, J. P. Moreau, G. L. Wilson
Instructors—G. E. Edwards, G. C. Gray, J. L. Gulley, R. S. Henderson, J. R. Huckell, A. H. MacKenzie, R. G. Townsend
Sessional Instructors—H. W. Bouwman, J. Gort

(Oto-Laryngology)
Clinical Professor—K. A. C. Clarke
Lecturer—T. C. Wilson
Instructor—P. T. Quinlan

(Thoracic and Cardiovascular Surgery)
Clinical Professor—J. C. Callaghan
Associate Professor—C. M. Couves
Instructors—C. S. Dafoe, H. Meltzer, C. Ross

(Urological Surgery)
Clinical Professor—J. O. Metcalfe
Associate Professor—W. H. Lakey
Assistant Clinical Professor—R. R. Francis
Instructor—F. D. Conroy
Sessional Instructors—T. C. Eid, L. Giroux, F. C. Marshall

Honorary Members—The Honorable A. Blais, N. E. Alexander, R. L. Anderson, W. S. S. Armstrong, E. Greene, R. G. Huckell, M. R. Marshall

Surg. and Clin. Surg. 431—R. A. Macbeth and Staff (275 hours)

Surgery and Clinical Surgery (third year)—(1) *Theatre Clinics*: Seventy-three one-hour formal clinics, five of which are given jointly with other departments, will be presented throughout the year by the Department of Surgery, including the surgical Specialities. These theatre clinics constitute the surgical contribution to the integrated course "Surgery of Human Disease".

(2) *Lecture Demonstrations*: Throughout the eleven week Surgical Trimester one hour per week is devoted to a lecture-demonstration, in the Surgical Medical Research Institute, of surgical research currently under investigation in the department. In addition one hour per week is devoted to a lecture demonstration in surgical radiology in co-operation with the Department of Radiology.

(3) *Clinics*: Eight hours of clinical instruction per week on the wards of the University of Alberta and Royal Alexandra Hospitals will be provided by the Department of Surgery including the Surgical Specialties during the trimester the student is assigned to surgery.

(4) *Ward Work*: Sixteen hours of ward work per week will be carried out under supervision at the University of Alberta, Royal Alexandra, Misericordia and General Hospitals during the trimester the student is assigned to surgery.

Surg. and Clin. Surg. 441—R. A. Macbeth and Staff (256 hours)

Surgery and Clinical Surgery (fourth year)—16 hours are devoted to a reading course in Surgery. The rest of the time takes the form of an 8 week clinical clerkship in the wards of various Edmonton Hospitals and in the outpatient department.

Surg.and Clin. Surg. 431—M. R. Marshall and Staff (32 hours)

Ophthalmology (third year)—(a) One hour lecture per week for twenty-one weeks. These lectures include the demonstration of patients and use of instruments where applicable.

(b) Clinical ophthalmology, one hour a week for eleven weeks in the form of small group bedside clinics.

Surg. and Clin. Surg. 431—K. A. C. Clarke and Staff (21 hours)

Otolaryngology (third year)—(a) One hour lecture per week for ten weeks.

(b) Clinical otolaryngology, one hour a week for eleven weeks in the form of small group bedside clinics.

Surg. and Clin. Surg. 441—M. R. Marshall, K. A. C. Clarke and Staff (16 hours)

Ophthalmology and Otolaryngology (fourth year)—While on their Surgical Quarter students will devote two hours per week to small group clinical bedside instruction in Ophthalmology and Otolaryngology.

Academic Honors and Awards, M.D. Course

Fourth Year M.D.

John W. Scott Award

1961 No Award
1962 Joseph Boyd MARTIN
1963 Edgar Garner KING

Moshier Memorial Medal

1959 David MacIndoo FAWCETT
1960 Lawrence Ardell HARKER
1961 Victor Enos SARTOR
1962 Joseph Boyd MARTIN
1963 Elliott Asher PHILLIPSON

Mewburn Memorial Gold Medal

1959 Richard William MALLEN
1960 Kalman Alexander Julius CSEUZ
1961 Alan Gerald SMITH
1962 Carol Ann COWELL
1963 Edgar Garner KING

The Conn Memorial Medal

1959 Richard William MALLEN
1960 Kalman Alexander Julius CSEUZ
1961 Dale Campbell BIRDSELL
1962 James Richard MILLER
1963 Elliott Asher PHILLIPSON

The Pope Memarial Medal

1959 Lois Ann STAYURA
1960 Leonard Edward SWISCHUK
1961 Lawrence Edward BRYAN
1962 Robert John RAINE
1963 Edgar Garner KING

S. S. Spaner Prize

1960 John Nelson CHAPPEL
1961 Thomas BAITZ
1962 Morris DAVIDMAN
1963 Alexander Reginald WATTS

Alberta Tuberculosis Association Prize

1959 No Award
1960 Leonard Edward SWISCHUK
1961 Thomas BAITZ
1962 No Award
1963 No Award

Third Year M.D.

Ssholarships of the Collegt of Physicians and Surgeons of the Province of Alberta

1959 1st Lawrence Ardell HARKER
2nd Norman Edgar HAMILTON
1960 1st Helen Florence FREVEL
2nd Walter Robert LYSAK
1961 1st Joseph Boyd MARTIN
2nd Carol Ann COWELL
1962 1st Edgar Garner KING
2nd Elliott Asher PHILLIPSON
1963 1st Errol Basil MARLISS
2nd Al MABERLEY

The Harrison Memorial Scholarship in Obstetrics and Gynaecology

1959 Kalman Alexander Julius CSEUZ
1960 Edwin N. GRAMLICH
1961 James Richard MILLER

1962 Edgar Garner KING
1963 Errol Basil MARLISS

The Prizes of the Associated Hospitals of Alberta

1959 (Surgery) John Nelson CHAPPEL
(Medicine) Lawrence Ardell HARKER
1960 (Surgary) William O'CALLAGHAN
(Medicine) Lawrence Edward BRYAN
1961 (Surgery) Joseph SHUSTER
(Medicine) Joseph Boyd MARTIN
1962 (Surgery) Edward Garner KING
(Medicine) Elliott Asher PHILLIPSON
1963 (Surgery) Al MABERLEY
(Medicine) Roger Graham KEITH

Second Year M.D.

Scholarships of the College of Physicians and Surgeons of the Province of Alberta

1959 1st Lawrence Edward Bryan
2nd Gary Brewster STANFORD
1960 1st Joseph Boyd MARTIN
2nd Robert John RAINE
1961 1st Elliot Asher PHILLIPSON
2nd Edgar Garner KING
1962 1st Gerald Albert BREDO
2nd Errol Basil MARLISS
1963 1st Donald Marvin CARR
2nd Morris Keith MILLER

Allan Coates Rankin Prize in Bacteriology

1959 Edward Carl BURCHAK
1960 Robert John RAINE
1961 Elliott Asher PHILLIPSON
1962 Roger Grahan KEITH
1963 Donald Marvin CARR

Nathan Brown Eddy Prize in Pharmacology

1959 Lawrence Edward RYAN
1960 Robert John RAINE
1961 Jerrold Nelson FINNIE
1962 Gerald Albert BREDO
1963 David Thomas DAWSON

First Year M.D.

Scholarships of the College of Physicians and Surgeons of the Province of Alberta

1959 1st Joseph SHUSTER
2nd Robert John RAINE
1960 1st Edgar Garner KING
2nd Jerrold Nelson FINNIE
1961 1st Martin Hugh ATKINSON
2nd Marvyn Prisiart WILLIAMS

1962 1st David Thomas DAWSON
2nd Joe Thomas Roy CLARKE
1963 1st Donald RAWLINSON
2nd Willy A. G. KRYNEN

Ardrey W. Downs Prize in Physiology

1959 Robert John RAINE
1960 Edgar Garner KING
1961 Thomas Henry GREIDANUS
1962 David Thomas DAWSON
1963 Willy KRYNEN

Program Leading to the Degree of Bachelor of Science in Medical Laboratory Science

The University of Alberta offers a degree course in Medical Laboratory Science to men or women who are interested in a career as laboratory supervisors or senior technologists in hospitals or medical science laboratories.

The course is four years in duration. The first, second and fourth years of the program are regular university years. The third year of the program includes a 12 month period of practical laboratory training under the supervision of the Faculty of Medicine.

Students will receive some remuneration from the hospital during the third year of the program.

The coordinator of the program is Miss J. Matheson, of the Department of Pathology.

Note: Intending students should read also those earlier sections of this calendar dealing with requirements for admission, student advisory services, the dean of women, registration, fees, payment of fees, living accommodation, students' union, student medical services, regulations of the university, examination results, appeals, withdrawal of students, supplemental examinations.

Immunization

Because individuals working in hospital laboratories run some risk of infection from materials which they will be handling, all students in the Medical Laboratory Science program must take a series of immunizations approved by the Office of the Dean of Medicine before they may commence the third year of the program.

Promotion

The pass mark in each subject is 50% but the general average each year of 60% is required for students in this program.

Examinations

Examinations will be held at the end of each academic year in all subjects given in that year and promotion to a subsequent year will depend upon satisfactory completion of the current year.

Hospital Practice

During the period of hospital practice in the third year of the program students will be registered full-time students at the university and will be

assigned to hospital laboratories approved for this training by the Council of the Faculty of Medicine at the University of Alberta.

Graduation

After successful completion of the full four year course the student will be eligible to graduate in the Spring Convocation. However, in order to qualify he must have obtained an overall average of at least 60% in the courses of all four years of the program.

Outline of Courses—B.Sc. (M.L.S.) Program

First Year	Course No.	1st Term Lect.	1st Term Lab.	2nd Term Lect.	2nd Term Lab.
Inorganic Chemistry	Chem. 230	3	4	3	4
Organic Chemistry	Chem. 250	3	3	3	3
English	English 200 or 210	3	0	3	0
Biology	Biology 130 or 230	3	3	3	3
Elementary Physiology	Physiol. 261	3	3	3	3
Physical Education	P.E. 218 or 228	0	2	0	2

Second Year	Course No.	1st Term Lect.	1st Term Lab.	2nd Term Lect.	2nd Term Lab.
Bacteriology	Bact. 361	3	3	3	3
Clinical Pathology	Clin. Path. 361	3	6	3	6
Clinical Biochemistry	Biochem. 400	2	3	2	3
Physics	Physics 100 or 200	3	2	3	2
An approved Humanities or Social Science option		3	0	3	0

Third Year	Course No.	1st Term Lect.	1st Term Lab.	2nd Term Lect.	2nd Term Lab.
An approved Natural Science option		3	0	3	0
Med. Lab. Science	M.L.S. 400	...	...	...	...

Fourth Year	Course No.	1st Term Lect.	1st Term Lab.	2nd Term Lect.	2nd Term Lab.
Biochemistry	Biochem. 300	3	3	3	3
Analytical Chemistry	Chem. 312	3	6	3	6
Clinical Biochemistry	Biochem. 401	2	0	0	0
Med. Lab. Science	M.L.S. 401	3	6	3	6
An approved Humanities or Social Science Option		3	0	3	0

Three-Year B.Sc.(M.L.S.) Program

The three-year B.Sc. (M.L.S.) program which was previously offered is no longer available to new registrants.

Students who were registered in the three-year program during the 1963-64 session may complete the program as it was in effect at that time; regulations appearing in the 1963-64 calendar with respect to the Medical Laboratory Science bursaries, summer training, hospital practice, examination, supplemental examinations, promotions and graduation will remain in effect for students completing the program.

Second Year	Course No.	1st Term Lect.	1st Term Lab.	2nd Term Lect.	2nd Term Lab.
Biochemistry	Biochem. 300	3	3	3	3
Clinical Biochemistry	Biochem. 400	2	3	2	3
Bacteriology	Bact. 361	3	3	3	3
Physics	Phys. 100 or 200	3	2	3	2
Humanities or Social Science option		3	0	3	0

Second year University to be followed by 18 weeks practical experience and training in an approved hospital laboratory. Students who propose to leave the course after the second year for a year or more before entering the final year are advised to consult the Dean, Faculty of Medicine before doing so.

Third Year	Course No.	1st Term Lect.	1st Term Lab.	2nd Term Lect.	2nd Term Lab.
Physiology	Physiol. 261	3	3	3	3
Analytical Chemistry	Chem. 312	3	6	3	6
Special Humanities or Social Science course					
An option					
An approved Natural Science option					

DETAILS OF COURSES
(B.Sc. (M.L.S.) Program)

Bacteriology

Bacteriology 361—R. D. Stuart, S. R. Toshach and Members of the Department (3-3; 3-3)

Pathogenic Bacteriology—The relation of bacteria, viruses, fungi and protozoa to disease. The isolation and identification of bacteria, pathogenic to man. A study of bacterial infections and of resistance and immunity. Some consideration will be given to comparative bacteriology.

Biochemistry

Biochemistry 300—Members of Staff (3-3; 3-3)

General Course—Structure and chemistry of the cell; acidimetry and alkalimetry; chemistry of carbohydrates, lipids, proteins and nucleic acids; enzymes;

bioenergetics; digestion, absorption and intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids; mineral metabolism; vitamins; blood chemistry; chemistry of respiration..
Prerequisites: Chemistry 230, Chemistry 250.

Biochemistry 400—H. B. Collier and D. J. Campbell (2-3; 2-3)

Clinical Biochemistry—Principles of instrumentation; quality control; clinical chemistry of blood and urine; gastric, kidney and liver function tests; disturbances of acid-base, electrolyte, and mineral metabolism; inborn errors of metabolism. The emphasis throughout the course is upon critical appraisal of biochemical methods as applied to the study of disease.
Prerequisite: Biochemistry 300.

Biochemistry 401 (2-0; 0-0)

Biochemistry—An advanced course in principles and instrumentation; quality control; clinical chemistry of blood and urine; gastric, kidney and liver function tests; disturbances of acid-base, electrolyte and mineral metabolism; inborn errors of metabolism.
Prerequisite: Biochemistry 400.

Biology

Biology 130 (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biology 230 (3-3; 3-3)

1st Term or 2nd Term

Plant Form and Function.—Comparative morphology and physiology of plants at an intermediate level.

2nd Term or 1st Term

Comparative Zoology—Animal morphology, physiology and development at an intermediate level.
Prerequisite: Biology 30 or 130.

Chemistry

Chemistry 230 (3-1s-3; 3-1s-3)

Inorganic Chemistry—Lectures: The fundamental concepts of Chemistry as applied to the elements and their compounds.
Laboratory: The preparation of some compounds; quantitative chemistry, and semi-micro qualitative analysis.
Prerequisite: Chemistry 130 or Chemistry 30 (High School) or equivalent.

Chemistry 250 (3-3; 3-3)

Organic Chemistry—Lectures: An introduction to a study of the compounds of carbon.
Laboratory: The preparation of some organic compounds.
Prerequisite: Chemistry 130 or Chemistry 30 (High School) or equivalent.

Chemistry 312 (3-6; 3-6)

Quantitative Analysis—Lectures: Principles and methods of quantitative analysis.

Laboratory: Gravimetric, volumetric, colorimetric and electrometric methods of analysis.
Prerequisites: Chemistry 230 or 232.

English

English 200 (3-0; 3-0)

A Survey of English Literature from Chaucer to the Twentieth Century—A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

English 210 (3-0; 3-0)

English Language and Literature—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Pathology

Pathology 361—H. E. Bell and J. Matheson (2-3; 2-3)

Clinical Pathology—A course in Clinical Pathology designed for students in the B.Sc.(M.L.S.) pattern. The lectures will be on the use and interpretation of laboratory methods as diagnostic aids. The laboratory periods will be designed to develop in the student a high degree of accuracy and reasonable speed in hematological and other clinical pathological procedures that are used in a modern hospital laboratory.

Pathology 400

Medical Laboratory Science—Medical Laboratory Science 400 is a rotation of 13 weeks in each of the following hospital departments—Bacteriology, Clinical Chemistry, and Hematology divisions; 6 weeks in blood banking and 3 weeks in histology. Lectures, weekly conferences and twice monthly seminars will be held to enlarge year and extend the practical training and to integrate work in all the areas covered. A comprehensive practical and theoretical examination will be held at the end of this training period. The pass mark in this course is 60%. Supplemental privileges are not allowed.

Pathology 401

Medical Laboratory Science—This course will be comprised of lectures, seminars and laboratory exercises on the following:— laboratory planning, organization and administration; statistical evaluation of selected procedures; directed observation and instruction in the use of special equipment; etc.

Physics

Physics 100 (3-3; 3-3)

General Elementary Physics—An introductory course on the basic principles of physics. Illustrated by experiments.

Physics 200 (3-3; 3-3)

General Physics—A general course in the fundamentals of physics, including mechanics, properties of matter, heat, sound, electricity and light. Illustrated by experiments.
Prerequisite: Matriculation Physics.

Note: Physics 100 is a terminal course. It is the only choice available to students lacking credit in Grade XII physics, and does not fulfil prerequisite requirements for any senior physics courses. Physics 200 may be taken following Grade XII physics; it is accepted as a prerequisite for certain courses on advanced topics in physics.

Physiology

Physiology 261—Staff (3-3; 3-3)

Elementary Human Physiology—This course will have the same lecture content as Physiology 361, but will have a separate laboratory program supplemented with discussion periods.

For students of Medical Laboratory Science and of the School of Rehabilitation Medicine and baccalaureate students of the School of Nursing only.

Prerequisites: Biology 30 (or Zoology 220 or 225 as a co-requisite); one of Physics 30 and Chemistry 30.

XVII

The School of Nursing

INFORMATION, REGULATIONS, COURSES

(1) INTRODUCTION

On September 28, 1923, the Board of the University of Alberta Hospital recommended to the Senate of the University of Alberta that a School of Nursing be constituted. In that year the new school was established under the Faculty of Medicine and offered two programs: a five-year program leading to the degree, Bachelor of Science in Nursing, and a three-year program leading to the Diploma in Nursing.

Until 1936 students completed the final year of the degree program at the Universities of British Columbia, Toronto or McGill. In 1937 Public Health Nursing was offered on this campus as one of the options in the final year. In 1946 a second option, Teaching and Supervision in Schools of Nursing, was made available.

A number of revisions have been made in the degree program. From 1923 through 1936 the students spent the first two academic years at university, the third and fourth at the hospital and the fifth year at university. There was a preliminary term of three months at the hospital at the close of the first academic session. The total time required in hospital was thirty months.

Students registering for the degree program in 1937 spent one academic year at university, thirty-one months in hospital and a final year at university.

From 1938 through 1951 the student spent one academic year at university, thirty-six months in hospital and a final year at university.

In 1951 the first year of the degree program was offered at the Calgary Branch of the University, as well as in Edmonton.

In September, 1952, the degree program was shortened to a four-year integrated course.

In September, 1952, a two-year program leading to the degree, Bachelor of Science in Nursing, was made available to registered nurses.

In May, 1954, at the request of the University of Alberta Hospital Board, the School of Nursing at the University of Alberta Hospital was placed under the jurisdiction of the Hospital Board and ceased to function under the Faculty of Medicine, University of Alberta.

In September, 1954, the degree course was changed to a five-year program. Through affiliation agreements, students could take the clinical portion of the curriculum at either the School of Nursing, Calgary General Hospital, Calgary, or at the School of Nursing, University of Alberta Hospital, Edmonton. The affiliation with the Calgary General Hospital was suspended from September 1960. Students now take the three clinical years, second, third and fourth at the University of Alberta Hospital School of Nursing.

Over the years a number of programs have been made available to graduate nurses. A one-year program leading to the Diploma in Public Health Nursing was instituted in 1937. The five months' course leading to the Certificate in

Advanced Practical Obstetrics was organized in 1943 and a one year program leading to the Diploma in Teaching and Supervision in Schools of Nursing was instituted in 1946.

Philosophy and Objectives of the School of Nursing

Philosophy

We believe that it is the responsibility of the University of Alberta School of Nursing to provide the kinds of learning experiences that will assist selected candidates in developing competence in nursing and in developing the ability to assume positions of responsibility and leadership in meeting the nursing needs of our changing society.

Objectives

To assist the student in developing the ability to make sound judgments based on critical thinking.

To assist the student in developing the nursing skills of total patient care based on the understanding of the biological, physical, and social sciences and to apply these skills and knowledge to a special field of interest.

To assist the student in realizing an increasing degree of emotional, social and professional maturity.

Student Life and Welfare

Students registered in the first or final year of the degree program and post-graduate students make arrangements for their own living accommodation. The women's residence on the Edmonton campus is available to a limited number. Application for reservations, accompanied by $30.00, should be forwarded to the Director of Housing, University of Alberta, in the early spring.

Students registered in the second, third and fourth years of the degree program are provided accommodation in the Nurses' Residence.

The University medical services at Edmonton and Calgary are available to post-graduate students and to students in the first and fifth years of the degree course.

The health services at the University of Alberta Hospital, Edmonton, provide medical services for students registered in the second, third and fourth years of the degree course.

Recreational facilities on the campus are available to all students.

Through a guidance program the staff seeks to assist students who have social, emotional and personal problems.

Professional counselling and guidance are available at the Student Counselling Service. The office of the Director is in the Administration Building, Edmonton. There is a Counselling Service in Calgary.

All students on admission are given aptitude and achievement tests.

Programs Offered by the School of Nursing

The University of Alberta School of Nursing offers the following basic and post-basic professional programs:

Undergraduate

A five-year program leading to the degree, Bachelor of Science in Nursing.

Graduate

A two-year program leading to the degree, Bachelor of Science in Nursing.
A one-year program leading to the Diploma in Public Health Nursing.
A one-year program leading to the Diploma in Teaching and Supervision in Schools of Nursing
A 5-month program leading to the Certificate in Advanced Practical Obstetrics.

Description of Programs

Basic Program Leading to the Degree of B.Sc. in Nursing

The general aim of the degree program is to prepare young women who will be competent to meet their responsibilities in the broad health program of their times.

The program of study is planned to utilize the scientific and liberal arts courses of the University as a background on which to build professional competence.

The first year of the program may be taken at the University of Alberta in Edmonton or in Calgary, or at the Junior College, Lethbridge.

The second, third and fourth years are taken at the School of Nursing, University of Alberta Hospital, Edmonton.

The fifth year is taken at the University of Alberta, Edmonton.

The program qualifies the student for first-level positions in hospital and public health fields.

Post-Basic Program Leading to the Degree of B.Sc. in Nursing

This program offers registered nurses the opportunity to qualify for the degree, B.Sc. in Nursing.

The program of study includes courses in the biological, physical, and social sciences, general education and nursing, qualifying the nurse for positions in Schools of Nursing and Public Health Agencies.

Program Leading to the Diploma in Public Health Nursing

The course is designed for registered nurses who wish to prepare themselves to function as staff nurses in official and voluntary public health agencies.

Program Leading to the Diploma in Teaching and Supervision in Schools of Nursing

The program is designed for registered nurses who wish to prepare themselves to function more effectively in administrative, supervisory and teaching activities.

Program Leading to the Certificate in Advanced Practical Obstetrics

The course provides a program of instruction and supervised clinical experiences for nurses who are interested in preparing for positions of responsibility in the field of obstetrical nursing.

General Fees

Applicable to the Degree Course (First and Final Years) and Diploma In Public Health or in Teaching and Supervision:

Students' Union: *	Edmonton	Calgary
General	$12.50	$15.50
Building Fund	15.00	17.00
University Athletic Board	7.00	12.00
	$34.50	$44.50

*Full particulars on these fees may be found in the Students' Union Handbook.

Applicable to the Diploma Course (First, Second and Third Years) and the Degree Course (Second, Third and Fourth Years):

	Edmonton	Calgary
Registration	$10.00	$10.00
Students' Union	4.50	.....
	$14.50	$10.00

Applicable to the Certificate in Advanced Practical Obstetrics:

Registration	$ 5.00
Medical Services	6.00
	$11.00

Instruction Fees (See also IV—Registration and Fees)

Certificate Course (Advanced Practical Obstetrics):

Instruction	$100.00

(2) ADMISSION REQUIREMENTS

A.—Basic Program Leading to the Degree of B.Sc. in Nursing

Students from Alberta high schools seeking admission to the University will be required to present:

(a) a High School Graduation Diploma with

(b) "B" or higher standing in the following Grade XII examination subjects:

1. English 30,
2. Social Studies 30,
3. Chemistry 30.
4, 5 & 6. *Three* of:
   Mathematics 30; French 30 or German 30 or Latin 30; Physics 30; Biology 30 (or 32);

(c) an average in these six courses of at least 60%.

Notes: 1. In 1966 Biology 30 will be a required subject for admission. If possible, applicants in 1965 should also have credit in this subject.

2. Students who completed Grade XII in 1954 or earlier will be given full consideration for admission. They are advised to write or see the Registrar of the University and to provide a complete transcript of their high school records.

These general regulations notwithstanding, the University may in its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

B.—Post-Basic Program Leading to the Degree of B.Sc. in Nursing

Applicants must be registered nurses and present evidence of professional competence and the ability to carry and profit from postgraduate study. Students will normally be required to complete at least the year of specialization as full-time intramural students of the School of Nursing, University of Alberta. Further requirements are:

1. Academic requirement outlined in "A" above.
2. Satisfactory clinical experience, including psychiatric nursing. Applicants must submit a transcript from their Hospital School of Nursing. Deficiencies in clinical experience will have to be made up and arrangements relative to length and type of experience are subject to the approval of the University.

***C.—Program Leading to the Diploma in Public Health Nursing**

***D.—Program Leading to the Diploma in Teaching and Supervision in Schools of Nursing**

Note: By 1965 all students admitted to programs C and D must meet University Academic and Professional requirements. Under exceptional circumstances, consideration may be granted on an individual basis and in consultation with the Student Counselling Services.

***E.—Program Leading to the Certificate in Advanced Practical Obstetrics**

*Applicants must be registered nurses and present evidence of professional competence and the ability to carry and profit from postgraduate study. Preference is given to applicants who meet the academic requirements outlined in "A" above.

Procedure for Admission to Undergraduate Program:

Basic Program Leading to B.Sc. in Nursing

1. Obtain application forms from the Registrar, University of Alberta.
2. Application forms and medical report form should be completed as outlined on page 17 (under admission procedures).

Note: Students in B.Sc. Nursing will undergo a further medical examination and interview at the University of Alberta Hospital, and must satisfy the hospital regarding their general suitability for nursing before being accepted into the clinical years (second, third and fourth years) of the program. Arrangements for the medical examination and interview at the hospital will be made by the School of Nursing during the first year at University.

Procedure for Admission to Graduate Programs:

Post Basic Program Leading to the Degree of B.Sc. in Nursing

Program Leading to the Diploma in Public Health Nursing

Program Leading to the Diploma in Teaching and Supervision in Schools of Nursing

Program Leading to the Certificate in Advanced Practical Obstetrics

1. Obtain application forms from the Registrar, University of Alberta.
2. The completed forms should be returned to the Registrar. This includes:
   (a) The University Application for Admission.
   (b) The Graduate Nurse Information Form.
   (c) Two Official High School Transcripts.
   (d) Transcript of School of Nursing Record.

(3) PROMOTION AND GRADUATION

In addition to the information given below, students should read carefully the regulations concerning attendance, examinations, and promotions, found in Part I of this calendar, as these also are applicable to students in the School of Nursing.

1. Students who have not cleared their first year will not be permitted to register for the second year of the degree program.
2. First-year students with *one* supplemental will be allowed to start the second year of the degree program. Failure to pass the supplemental will result in their being asked to withdraw from the degree program.
3. First-year students with *two* supplementals will be required to clear at least one course at Summer School to entitle them to the privileges outlined for the student with one supplemental.
4. Students registered in the second, third, and fourth years of the degree program are subject to the regulations governing promotion and graduation as outlined in the calendar of the affiliating school.
5. Students registered in the final year of the degree program, in one of the one-year diploma courses, or in the certificate course must obtain a weighted average of at least 65%. Three supplemental examinations for the purpose of raising the average may be granted. Which supplemental examination may be written will be decided by the Academic Staff of the School of Nursing.
6. Students who have unexcused absences totalling *one-eighth* or more of the total number of lectures in each course may be refused permission to write the final examination.
7. Field experience must be completed before a student will be recommended to General Faculty Council for the degree, diploma, or certificate for which she is a candidate.
8. No student registered in the post-basic program may proceed to the work of the next year without having completed satisfactorily the clinical experience as outlined in the calendar.

(4) PROGRAMS OF STUDY

NOTE: Except in Advanced Practical Obstetrics, the weekly hours of instruction for various courses are set out for both terms of the winter session. The letter "c" attached to a figure signifies clinic-hours, and the letter "s" seminar-hours. Otherwise, the first figure in each term indicates lecture-hours and the second laboratory hours.

A.—Basic Program Leading to the Degree of Bachelor of Science in Nursing

First Year

Chemistry 250
English 210 or English 200.
Nursing Education 231
Physical Education
Psychology 212 or Psychology 202
Biology 130 or 230
Sociology 202

Second Year

Psychology 353. Instructional and clinical practice in all other courses are offered at the School of Nursing, University of Alberta Hospital, Edmonton.

Note: Students in the degree program in nursing must be successful in all university subjects in order to remain in the program.

Third and Fourth Years

Instruction and clinical practice are offered at the School of Nursing, University of Alberta Hospital, Edmonton.

Fifth Year

Students will be required to make a choice of a major field of interest: *either* Public Health Nursing *or* Teaching and Supervision in Schools of Nursing.

I—Public Health Nursing

1. Course and Number	Subject	Hrs. per wk.
P.H. 401	Health Seminar	(0-0; 2-0)
P.H. 403	Introduction to Social Welfare	(2-2; 0-0)
N.Ed. 450	Principles of Teaching Nursing and Health	(3-2; 0-2)
N.Ed. 451	Current Trends in Nursing	(0-0; 2-0)
Soc. 202	Sociology or approved Senior option	(3-0; 3-0)
Approved Senior Psychology		(3-0; 3-0)
P.H. 400	Public Health Nursing	(3-0; 3-2s)
P.H. 405	Maternal Health	(2-0; 0-0)
P.H. 407	Child Health	(0-0; 3-0)
P.H. 402	Epidemiology	(2-0; 1-0)
N.Ed. 459	Introduction to Hospital Nursing Service Administration	(2-0; 0-0)

2. *Field Experience*

Observation and supervised experience in public health nursing is required as part of the course. This is arranged to meet the individual needs of the students:

1. Concurrent field experience is included in a number of courses. Students spend *one half day* per week during the first term and *one and one-half days* per week during the second term observing and teaching in local health and social agencies.
2. Four weeks of full time field experience in selected health agencies following final examinations.

II—Teaching and Supervision

1. Course and Number	Subject	Hrs. per wk.
P.H. 401	Health Seminar	(0-0; 2-0)
P.H. 403	Introduction to Social Welfare	(2-2; 0-0)
N.Ed. 450	Principles of Teaching Nursing and Health	(3-2; 0-2)
N.Ed. 451	Current Trends in Nursing	(0-0; 2-0)
Soc. 202	Sociology	(3-0; 3-0)
Approved Senior Psychology		(3-0; 3-0)
N.Ed. 453	Hospital Nursing Service	(6-0; 0-0)
N.Ed. 455	Administration in Schools of Nursing	(0-0; 5-0)
N.Ed. 457	Curriculum Planning	(0-0; 2-5s)
P.H. 409	Public Health Nursing	(2-0; 0-0)

2. *Field Experience*

1. Concurrent field experience is included in a number of courses. Students spend *one half day* each week during the first term in observing in local health agencies. Observation and supervised practice in teaching, *one and one-half days* each week during the second term.
2. Four weeks of observation and supervised experience planned to meet the individual needs of each student following the final examinations.

B.—Post-Basic Program Leading to the Degree of Bachelor of Science in Nursing

First Year

Chemistry 250.
English 210 or English 200.
Physical Education.
Psychology 212 or Psychology 202.
Biology 130 or 230
Sociology 202.

Second Year

This is the same as the fifth year of the basic program with the addition of Bacteriology 441 and senior psychology (half year).

C.—Program Leading to the Diploma in Public Health Nursing

I—Public Health Nursing, Fifth Year of the Basic Program, modified as follows:

1. N.Ed. 459 is replaced by
   Bact. 441. Bacteriology (1-3; 0-0)
2. The Approved Senior Psychology Course is replaced by
   Psychology 202 or 212, or Ed. 276
3. For students who do not have adequate clinical experience in Psychiatry, an added two weeks of experience at the Provincial Mental Hospital may be arranged.

D.—Program Leading to the Diploma in Teaching and Supervision in Schools of Nursing

II—Teaching and Supervision, Fifth Year of the Basic Program, modified as follows:

1. P.H. 409 is replaced by
   Bact. 441. Bacteriology (1-3; 0-0)

2. The Approved Senior Psychology Course is replaced by Psychology 202 or 212, or Ed. 276
3. For students who do not have adequate clinical experience in Psychiatry, an added two weeks of experience at the Provincial Mental Hospital may be arranged.

E.—Program Leading to the Certificate in Advanced Practical Obstetrics

Two courses in Advanced Practical Obstetrics will be conducted during the year:

August 31, 1964 to January 22, 1965.
February 8, 1965 to June 25, 1965.

1. Subjects:

		Hrs. per wk. (10 weeks)
Principles of Obstetrics and Mechanisms of Labour	A.O. 35	3-0
The Care of the Obstetrical Patient	A.O. 35A	12-3c
Infant Care	A.O. 35B	1-0
Principles of Supervision and Teaching in Obstetrical Nursing	A.O. 35C	2-0

2. Clinical Experience:
   1. Concurrent supervised experience in the antepartum and postpartum care of patients and in the care of the normal premature infant. Fifteen hours each week during part one of the course.
   2. Eight weeks observation and supervised clinical experience in selected obstetrical units throughout the province. Each student must deliver, under medical supervision, a minimum of twenty cases during part two of the course.
   3. On satisfactory completion of the clinical experience the student returns for two weeks to the University where the course is summarized, case reports reviewed, and a written and oral examination conducted. This constitutes part three of the course.

(5) DETAILS OF COURSES

The University School of Nursing reserves the right to withdraw any of the courses here outlined.

Students are reminded that attendance is expected in all courses.

TEACHING STAFF—

Associate Professors—Ruth E. McClure (Director of the School), Margaret M. Campbell

Assistant Professor—Salomea Tretiak

Lecturers—Peggy Field, Betty Harrington, Ruth Elliott

and—

Members of the Departments of Anatomy, Bacteriology, Botany, Chemistry, Dentistry, English, Household Economics, Medicine, Obstetrics and Gynaecology, Oto-Laryngology, Paediatrics, Pathology, Pharmacy, Psychology, Physical Education, Preventive Medicine, Psychiatry, Radiology, Rehabilitation Medicine, Sociology and Anthropology, Surgery, and Zoology.

I. COURSES IN NURSING

(For details of courses given in the second, third and fourth years of the degree course, see the Calendar of the School of Nursing, University of Alberta Hospital, Edmonton.)

NURSING EDUCATION

N.Ed. 231. Orientation to Nursing—R. Elliott (2-0; 0-0)

A series of discussions designed to give the beginning student a general concept of the field of nursing and the responsibilities and obligations of the individual who chooses this profession.

N.Ed. 450. Principles of Teaching Nursing and Health—R. McClure (3-2; 0-2)

Principles underlying the teaching-learning process; methods of directing learning, organization of materials of instruction. Health teaching as applied to the practice of public health nursing in the home, school, and health centres. Practice in public speaking and supervised teaching will be included.

N.Ed. 451. Current Trends in Nursing—R. Elliott (0-0; 2-0)

A study of the progress and trends in professional nursing in the light of historical influences and present-day social developments.

N.Ed. 453. The Hospital Nursing Service—S. Tretiak (6-0; 0-0)

Principles of organization and administration applied to selected departments of the hospital; principles, practices, and problems of ward management; supervision as it relates to the improvement of nursing.

N.Ed. 455. Administration in Schools of Nursing—S. Tretiak (0-0; 5-0)

Principles of organization and administration as applied to schools of nursing. Administrative functions related to students—recruitment and selection, housing, health; principles and techniques of guidance. Faculty. Financial and legislative controls. Records.

N.Ed. 457. Curriculum Planning—S. Tretiak (0-0; 2-5S)

Principles and methods of curriculum construction; aims, standards, sources, techniques; planning the program of studies; tests, analyses and interpretation of results.

N.Ed. 459. Introduction to Hospital Nursing Service Administration (2-0; 0-0)
R. Elliott

Principles of organization, administration and supervision of Nursing services in hospitals as they relate to the improvement of nursing. (For B.Sc. students only.)

PUBLIC HEALTH

P.H. 400. Public Health Nursing—M. Campbell (3-0; 3-2S)

Trends and developments in preventive medicine; the organization and administration of public health services; the role of the nurse in public health services; the fundamental principles of public health nursing. Observation and practice in selected community health agencies.

P.H. 401. Health Seminar—B. Harrington and Guest Lecturers (0-0; 2-0)
A study of the changing emphases in health programs, including an introduction to health statistics.

P.H. 402. Epidemiology—M. Campbell (2-0; 1-0)
A study of the factors concerned with the transmission of disease; methods of control and prevention of Communicable Disease in the community; the collection and interpretation of statistical data.

P.H. 403. Introduction to Social Welfare—I. Munroe (2-2; 0-0)
Introduction to the principles of social welfare and their application. Community resources available to assist patients and families. Visits to community agencies are included.

P.H. 405. Maternal Health—M. M. Hutton (2-0; 0-0)
A study of modern concepts of adequate maternity care with emphasis on prenatal care and the nurse's role in assisting in the provision of sound physical and emotional health of the mother and child.

P.H. 407. Child Health—R. McClure (0-0; 3-0)
A study of modern concepts of adequate child care, with special emphasis on the nurse's role in assisting to establish a sound basis for physical and emotional development.

P.H. 409. Public Health Nursing—B. Harrington (2-0; 0-0)
Principles of Public Health Nursing; the role of the nurse in Public Health services with emphasis on co-operation between Public Health and hospital services in the community.
(For B.Sc. students only.)

ADVANCED OBSTETRICAL NURSING

A.O.35. Principles of Obstetrics and Mechanisms of Labour (3-0)
Dr. J. Ross Vant, Dr. W. D. Frew, Dr. A. E. Gain
The physiology and management of normal and abnormal pregnancy; theory and management of labour and delivery; principles underlying the administration of anaesthesia and analgesia; gynaecological conditions; the menopause.

A.O.35A. The Care of the Obstetrical Patient—P. Field (12-3c)
Lectures, tutorials and concurrent field experience in ante, intra and postpartum care.

A.O.35B. Infant Care—Dr. J. K. Martin (1-0)
The care of the normal and premature infant during the neonatal period.

A.O. 35C. Principles of Supervision and Teaching in Obstetrical Nursing—P. Field (2-0)
The principles of supervision and teaching; their application in nursing service and nursing education.

II. COURSES OFFERED BY OTHER DEPARTMENTS

BACTERIOLOGY

Bacteriology 441.—A. M. Bursewicz (2-2; 0-0)

Bacteriology—The relation of bacteria to individual and community health. A study of infection and resistance in man and of methods of diagnosis and control of infectious disease.

BIOLOGY

Biology 130. (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biology 230. (3-3; 3-3)

1st Term or 2nd Term

Plant Form and Function—Comparative morphology and physiology of plants at an intermediate level.

2nd Term or 1st Term

Comparative Zoology—Animal morphology, physiology and development at an intermediate level.

Prerequisite: Biology 30 or 130.

CHEMISTRY

Chemistry 250. (3-3; 3-3)

Organic Chemistry—An introduction to a study of the compounds of carbon. Laboratory: The preparation of some organic compounds.

Prerequisite: Chemistry 130 or 30 of High School or equivalent.

EDUCATIONAL PSYCHOLOGY

Ed.Psy. 276. (3-0; 3-0)

Introduction to Educational Psychology—An introduction to childhood and adolescence, stressing physical, mental, social, emotional, and personality development; the psychology of learning and of the special learning areas: the application of psychological principles to classroom practice.

ENGLISH

English 200. (3-0; 3-0)

A Survey of English Literature from Chaucer to the Twentieth Century—A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

Authors: Chaucer, More; Shakespeare, Jonson, Milton; Defoe, Pope, Swift; Wordsworth, Keats, Brontë, Tennyson, Browning; Yeats or Eliot, O'Casey or Shaw, Golding or Orwell. Other required reading: *Everyman* and appropriate selections of lyric verse.

English 210. (3-0; 3-0)

English Language and Literature—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Texts: To be announced.

PHYSICAL EDUCATION

All first-year students are required to take two hours of physical education per week. Those excepted from this regulation are:

1. those declared unfit by the University Medical Services;
2. students over 25 years of age.

Students in these categories must register with the Faculty of Physical Education.

Individual lockers, locks, towels and shower facilities are available for all students. The program is conducted in the Physical Education Building.

The prescribed gymnasium costume is:

Shorts (dark green)
Sports blouse (white)
Socks (white)
Running shoes

Shorts may be purchased at the University Bookstore.

All first-year students are required to register in Physical Education.

P.E. 228—Physical Education Staff (0-2; 0-2)

Recreational Activities (Women)—Emphasis on the fundamentals of the following recreational and fitness activities: aquatics, movement fundamentals, tennis, badminton, dance and golf.

PSYCHOLOGY

Psychology 202 (2-2; 2-2)

Introduction to General Psychology—A survey of problems, methods and principles in various fields of psychology.

Psychology 212 (3-0; 3-0)

General and Developmental Psychology—A survey of problems, methods and principles in various fields of psychology, with particular emphasis on child, adolescent and adult development and behavior.

Psychology 353 (3-0; 0-0)

Developmental Psychology—A study of behavior as it is related to normal development and aging.

For descriptions of senior courses in psychology see the Calendar of the Faculties of Arts and Science.

SOCIOLOGY

Sociology 202—Staff (3-0; 3-0)

Introductory Sociology—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformists behavior.

For senior courses in Sociology refer to the Calendar of the Faculties of Arts and Science.

XVIII

The Faculty of Pharmacy

INFORMATION, REGULATIONS, COURSES

FACULTY OF PHARMACY

(1) OPPORTUNITIES IN PHARMACY

With the rapid advancement being made in medical science during the present century, pharmacy is becoming a more and more specialized profession. The responsibilities associated with the distribution of drugs and pharmaceutical preparations are constantly increasing as new therapeutic agents are developed. In addition, the importance in the community of the pharmacist as a counsellor on public health matters and as a source of scientific information of a general character is becoming better appreciated by the general public. Educational standards have been advanced to meet these increasing demands and ample scope is provided to the young man or woman who wishes to enter pharmacy as a career.

There is always a demand for well-trained pharmacists and never before have opportunities been so great in pharmacy and its many allied fields. The following are some of the avenues open to qualified pharmacists: as proprietors, managers, and prescription clerks in retail stores; as dispensers in hospital pharmacies; as pharmaceutical and research chemists in manufacturing plants; as manufacturers' or wholesalers' representatives.

Retail Pharmacy

Retail pharmacy continues to attract the highest proportion of graduates. Since pharmacy is both a profession and a business this unique combination offers a satisfying and rewarding opportunity for service. The expanding economy of the country, and of Alberta in particular, will continue to provide conditions favorable to success.

Hospital Pharmacy

The contribution which the pharmacist can make in the hospital is being more fully realized and his skills more adequately utilized. His duties include the dispensing of prescriptions, control of drugs and other stores and supplies, manufacture of drugs, preparations, parenteral solutions, etc., the compiling and organization of data on recent advances in pharmacy so as to act as an adviser to nurses and doctors on new developments.

Public Health Laboratories

Graduates in pharmacy are well qualified to fill positions in municipal, provincial and federal health laboratories.

Manufacturing Pharmacy

There are many openings in manufacturing firms for pharmacy graduates as pharmaceutical and research chemists. This is particularly true for those graduates who supplement their basic pharmaceutical education with advanced or specialized training. Many graduates, also, find interesting and useful posi-

tions as manufacturers' representatives. Association with such firms opens up the possibility of advancement to executive positions.

Research

Upon completion of his undergraduate work the capable student finds many possible avenues open to him for graduate work leading to advanced degrees. Such special training equips the student for gratifying positions in research and teaching.

Women in Pharmacy

There are many opportunities for women in pharmacy. They find a natural place in hospitals, medical clinics, and in the larger dispensaries. Also, an increasing number of women are entering the field of retail pharmacy and research.

(2) QUALIFICATIONS FOR PRACTICE IN ALBERTA

The Bachelor of Science degree in Pharmacy of the University of Alberta is the minimum academic requirement accepted by the Alberta Pharmaceutical Association for the licence to practise pharmacy in the province of Alberta. This requirement is met by the completion of the three year program.

A fourth year is available for those wishing to specialize in Pharmacy Administration, Hospital Pharmacy or Science.

Candidates for the course in pharmacy were formerly required to complete twelve months of practical experience before entering the University. This requirement has been withdrawn. In order to register as a pharmacist with the Alberta Pharmaceutical Association a graduate must have completed 12 months of practical experience but this need not be served before university entrance. Information concerning the regulations applying to practical experience in Alberta may be obtained from the Registrar-Treasurer, Alberta Pharmaceutical Association, College of Physicians and Surgeons Building, 9901-108 Street, Edmonton, Alberta.

The regulations governing the practice of Pharmacy in the Province of Alberta are set forth in the Alberta Pharmaceutical Association Act.

(3) ENTRANCE REQUIREMENTS

Students from the high schools of Alberta seeking admission to the Faculty of Pharmacy will be required to present:

(a) a high school diploma with

(b) "B" or higher standing in English 30; Social Studies 30; Mathematics 30; Chemistry 30; and any two of: Physics 30, Biology 30 (or 32), French 30 or German 30 or Latin 30, or another language at an equivalent level. (Physics and Biology 30 are recommended as the most practical options.)

(c) an average in these courses of at least 60%.

Applications to enter the Faculty of Pharmacy should be submitted to the Registrar, University of Alberta, on or before the August date shown in the Academic Schedule.

Enrolment in any faculty must necessarily be limited to the number of students who can be accommodated. Students are normally accepted in the order of their academic standing from among the whole list of applicants. Students therefore, should not come to the University until they have received an official acceptance of their application.

These general regulations notwithstanding, the University may in its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

(4) PASS REQUIREMENTS

The pass mark in all lecture courses is 50%; the pass mark in laboratory courses in pharmacy subjects is 60%. In the case of failure in a pharmacy laboratory course there is no supplemental privilege and the laboratory course, together with the corresponding lecture course, must be repeated.

(5) PROGRAMS OF STUDY

The first three years of the curriculum are common to all patterns. A student may elect to complete the four year course and be awarded a degree with Honors or Major in the area of specialization; or he may elect to accept the general degree at the end of three years.

Honors Program—Students with a 65% or better average over the second and third years will be eligible to take the fourth year as an Honors Program. Those obtaining a 65% or better average mark over the second, third and fourth years will be awarded the degree of Bachelor of Science in Pharmacy with Honors in Pharmacy Administration, or Hospital Pharmacy, or Pharmaceutical Science. Those obtaining an 80% or better average will be awarded the degree with First Class Honors.

Degree with Major—Students with satisfactory records but with less than a 65% average over the second and third years will be eligible to take the fourth year as a Major Program. Successful candidates will be awarded the degree of Bachelor of Science in Pharmacy with Major in Pharmacy Administration, or Hospital Pharmacy or Pharmaceutical Science.

Honors candidates who pass all courses but do not obtain honors standing will be granted a degree with a Major in the specialty.

All programs of study must be worked out in consultation with members of the faculty and approved by the Dean. It is desirable that students decide after the first year the area of later specialization so that options in the second and third years may provide a foundation for the chosen specialty. For example, a student planning to enter the Pharmacy Administration program would be advised to select courses in economics and commerce; students planning to enter Hospital Pharmacy might select courses in biochemistry and microbiology; students planning to enter the Pharmaceutical Science pattern might select mathematics, statistics or chemistry.

Note: The lecture courses in pharmacy are designated by even numbers. The corresponding laboratory course is indicated by the odd number immediately following the lecture number.

First Year

Subjects	Course No.	First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Biology*	Biol. 130 or 230	3	3	3	3
Chemistry	Chem. 230	4	3	4	3
Organic Chemistry	Chem. 250	3	3	3	3
Introductory Pharmacy	Pharm. 210	3	...	3	...
Introductory Pharmacy Lab.	Pharm. 211	...	3	...	3
Latin	Latin 205	1	...	1	...
English	Eng. 210	3	...	3	...
Physical Education	Phys. Ed.	...	2	...	2

*Students with Biology 30 take Biology 230. Others take Biology 130.

Second Year

Subjects	Course No.	First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Pharmacognosy and Introductory Analysis	Pharm. 320	2	...	2	...
Pharmacognosy and Introductory Analysis Laboratory	Pharm. 321	...	3	...	3
Dispensing Pharmacy	Pharm. 322	3	...	3	...
Dispensing Pharmacy Laboratory	Pharm. 323	...	3	...	3
Bacteriology	Bact. 320	3	3	3	3
Physiology	Physiol. 361	3	2	3	2
Physics*	Physics 100 or 200	3	3	3	3
Option**		3	...	3	...

*Students with Grade XII Physics take Physics 200. Others take Physics 100.

**An approved course in the Humanities or Social Sciences.

Third Year

Subjects	Course No.	First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Biochemistry	Biochem. 300	3	3	3	3
Pharmacology	Pharmacol. 431	2	3	2	3
Pharmaceutical Analysis	Pharm. 430	2	...	2	...
Pharmaceutical Analysis Lab.	Pharm. 431	...	3	...	3
Pharmaceutics	Pharm. 432	2	...	2	...
Pharmaceutics Lab.	Pharm. 433	...	3	...	3
Forensic Pharmacy	Pharm. 434	2	...	...	...
Pharmaceutical Chemistry	Pharm. 436	3	...	3	...
Option*		3	(3)	3	(3)

*An approved Arts or Science course.

Fourth Year

Pharmacy Administration—

Subjects	Course No.	First Term		Second Term	
		Lect.	Lab.	Lect.	Lab.
Pharmaceutical Therapeutics	Pharm. 444	3	0	3	0
Pharmacy Management	Pharm. 448	2	0	2	0
Thesis	Pharm. 449	1S	3	1S	3
Accounting	Acct. 200	3	2	3	2
Veterinary Science	Vet. Sci. 404	1	0	1	0

An approved option in economics or commerce.

An approved senior pharmacy course.

An approved senior science course.

Hospital Pharmacy—

Advanced Pharmaceutical Analysis	Pharm. 440	3	0	3	0
Adv. Pharm. Anal. Lab.	Pharm. 441	0	3	0	3
Advanced Pharmaceutics	Pharm. 442	1	0	1	0
Advanced Pharmaceutics Lab.	Pharm. 443	0	3	0	3
Pharmaceutical Therapeutics	Pharm. 444	3	0	3	0
Hospital Pharmacy	Pharm. 446	1	0	1	0
Hospital Pharmacy Laboratory	Pharm. 447	0	4	0	4
Thesis	Pharm. 449	1S	3	1S	3
Accounting	Acct. 200	3	2	3	2

An approved senior course in pharmacy or other science.

Pharmaceutical Science—

Advanced Pharm. Anal.	Pharm. 440	3	0	3	0
Advanced Pharm. Anal. Lab.	Pharm. 441	0	3	0	3
Thesis	Pharm. 449	1S	3	1S	3

One of:—Math. 180 or 201, Statistics 255 or Biometrics 455.

One of:—Chem. 430, 450, 370, Biochem. 400, Physiol. 505.

One additional course from the above or an approved senior course in pharmacy or other science.

(6) GRADUATE STUDY

Students may undertake graduate study in pharmacy leading to the degree of M.Sc. or Ph.D. Any students contemplating such work should discuss their programs with the Dean of the Faculty of Pharmacy. They should also familiarize themselves with the regulations and procedures laid down by the Faculty of Graduate Studies. These may be found in the calendar of the Faculty of Graduate Studies. A few of the more important regulations are summarized below:

1. Students planning to begin graduate work should make application, not later than the date set in the Academic Schedule, for admission to the Faculty of Graduate Studies. Applications should be addressed to the Dean, Faculty of Graduate Studies.

2. Students planning to continue graduate study are reminded that, in addition to completing regular registration forms, they must submit to the Faculty of Graduate Studies a new program form showing the courses immediately to be taken and noting any changes in the original program of studies.
3. Students must register and pay the usual registration and other fees for the session in which they submit their theses.

(7) DETAILS OF COURSES

(Regular attendance is expected of all students in the Faculty of Pharmacy.)

NOTE: The weekly hours of instruction for both terms of the winter session are shown at the top of each course description. The first figure in each term indicates lecture-hours and the second laboratory-hours.

BIOCHEMISTRY

Biochemistry 300—Members of Staff (3-3; 3-3)

General Course—Structure and chemistry of the cell; acidimetry and alkalimetry; chemistry of carbohydrates, lipids, proteins and nucleic acids; enzymes; bioenergetics; digestion, absorption and intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids; mineral metabolism; vitamins; blood chemistry; chemistry of respiration.

Prerequisites: Chemistry 230, Chemistry 250.

Biochemistry 400—H. B. Collier and D. J. Campbell (2-3; 2-3)

Clinical Biochemistry—Principles of instrumentation; quality control; clinical chemistry of blood and urine; gastric, kidney and liver function tests; disturbances of acid-base, electrolyte, and mineral metabolism; inborn errors of metabolism. The emphasis throughout the course is upon critical appraisal of biochemical methods as applied to the study of disease.

Prerequisite: Biochemistry 300.

BIOLOGY

Biology 130 (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biology 230 1st Term or 2nd Term (3-3; 3-3)

Plant Form and Function. Comparative morphology and physiology of plants at an intermediate level.

2nd Term or 1st Term

Comparative Zoology. Animal morphology, physiology and development at an intermediate level.

Prerequisite: Biology 30 or 130.

CHEMISTRY

Chemistry 230 (3-1S-3)(3-1S-3)

Inorganic Chemistry—Lecture: The fundamental concepts of chemistry as applied to the elements and their compounds.

Laboratory: The preparation of compounds, quantitative chemistry and semi-micro qualitative analysis.

Prerequisite: Chemistry 130 or 30 of High School or equivalent.

Chemistry 250 (3-3; 3-3)

Organic Chemistry—Lectures: An introduction to a study of the compounds of carbon.
Laboratory: The preparation of some organic compounds.
Prerequisite: Chemistry 130 or 30 of High School or equivalent.

Chemistry 450 (3-3; 3-3)

Organic Chemistry—Lectures: Continuation of the study of the aromatic and aliphatic compounds. General considerations and mechanisms involved in their reactions.
Laboratory: Preparation of some organic compounds.
Prerequisites: Chem. 230 and 250 or 350.
Prerequisites or corequisites: Chem. 370 or 372.

ENGLISH

English 210 (3-0; 3-0)

English Language and Literature—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.
Texts: to be announced.

LATIN

Latin 205—R. J. Braun (1-0; 1-0)

Latin for Pharmacy Students—The basic grammar of Latin with studies in the vocabulary which forms the basis for pharmaceutical terms.

MICROBIOLOGY

Microbiology 320—G. E. Myers (3-3; 3-3)

Bacteriology—An introduction to bacterial classification, metabolism and behaviour with emphasis on the practical application of this knowledge in human and animal disease. Special consideration will be given to disinfectants, chemotherapeutic agents and antibiotics and to the discussion of resistance and immunity. The laboratory course provides an introduction to bacteriological techniques, methods of sterilization, assay and control procedures in the production of antibiotics, disinfectants and biologicals.
Prerequisite: Chemistry 130 or 230 and Botany 202 or Zoology 225 or Biology 130 or 230.

PHARMACOLOGY

Pharmacology 431—E. E. Daniel, D. P. MacLeod, W. A. Mahon, G. S. Marks, C. W. Nash and Staff (3-3; 2-3)

Pharmacology—A course on the pharmacological action of drugs selected for their physiological and clinical significance. The course includes a study of basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs studied include general and local anaesthetics; hypnotics, sedatives, and anticonvulsants; analgesics; central nervous system stimulants; autonomic and curariform drugs; histamine and antihistaminics; cardiovascular drugs; diuretics; heavy metals and their antagonists; haemostatic agents and anticoagulants.

Instruction is given in the form of lectures, demonstrations, laboratory exercises and original work. Written and oral reports, based on original work, are required of each student.

Textbooks: Goth, *Medical Pharmacology;* Goodman and Gilman, *The Pharmacological Basis of Therapeutics,* 2nd Edition.

PHARMACY

STAFF:

Professors—M. J. Huston (Dean of the Faculty), B. E. Riedel
Associate Professors—A. J. Anderson, L. G. Chatten, K. H. Palmer, J. C. Morrison
Assistant Professor—R. E. Moskalyk
Lecturer—J. N. Hlynka
Sessional Lecturers—W. W. Maday, D. M. Cameron, Mrs. A. Sim
Sessional Instructors—T. W. Kassian, N. K. Barth, J. W. Morrison, R. R. Shears

Pharmacy 210—M. J. Huston and R. E. Moskalyk (3-0; 3-0)

Introductory Pharmacy—Introduction to physical pharmacy; classification of pharmaceutical preparations; pharmaceutical calculations; pharmaceutical history, literature and terminology.

Textbooks: Martin and Cook, *Remington's Practice of Pharmacy;* Huston, *A Textbook of Pharmaceutical Arithmetic;* Huston, *Test and Improve Your Scientific Word Power.*

Pharmacy 211 (0-3; 0-3)

Introductory Pharmacy Laboratory—The practical application of the principles covered in Pharmacy 210; compounding of representative pharmaceutical preparations discussed in Pharmacy 210.

Textbooks: Pharmacy 211 Laboratory Manual.
Prerequisite or Corequisite: Pharmacy 210.

Pharmacy 320—K. H. Palmer (2-0; 2-0)

Pharmacognosy and Introductory Analysis—A study of drugs and other raw materials of vegetable and animal origin; their history, commerce, cultivation, collection, preparation for market and storage; the chemistry of their constituents and related substances; introduction to physical and chemical methods of analysis.

Textbooks: Trease, *Textbook of Pharmacognosy,* 8th edition or Ramstad, *Modern Pharmacognosy.*
References: Fieser and Fieser, *Advanced Organic Chemistry;* Fieser, *Topics in Organic Chemistry.*

Pharmacy 321 (0-3; 0-3)

Pharmacognosy and Introductory Analysis Laboratory—A macroscopic and microscopic examination of crude drugs together with chemical and physical tests for their identification and evaluation. An introduction to quantitative methods of pharmaceutical analysis.

Textbooks: Wallis, *Practical Pharmacognosy,* 6th edition; Vogel, *Quantitative Inorganic Analysis,* 3rd edition.

Pharmacy 322—J. C. Morrison (3-0; 3-0)

Dispensing Pharmacy—General pharmaceutics including methods of handling and compounding typical prescriptions; dispensing specialties, posology; surgical dressings.

Prerequisite or Corequisite: Pharmacy 210 and 211.

Pharmacy 323 (0-3; 0-3)

Dispensing Pharmacy Laboratory—Extensive practice in the compounding and dispensing of type prescriptions.

Textbooks: Martindale, *The Extra Pharmacopoeia*, Volumes I and II and 1961 Addendum; Watson, *Aids to Dispensing*, 5th edition; Morrison, *Manual of Laboratory Dispensing.*

Prerequisite or Corequisite: Pharmacy 210, 211, and 322.

Pharmacy 430—L. G. Chatten (2-0; 2-0)

Pharmaceutical Analysis—Physical and chemical methods of identification and analysis; an introduction to instrumental analysis.

Textbook: Beckett and Stenlake, *Practical Pharmaceutical Chemistry.*

Pharmacy 431 (0-3; 0-3)

Pharmaceutical Analysis Laboratory—Analysis of pharmaceutical preparations; physical and chemical methods of analysis; practice in the use of certain analytical instruments.

Textbooks: Willard, Merritt and Dean, *Instrumental Methods of Analysis;* Chatten and Riedel, *Laboratory Manual.*

Prerequisites: Pharmacy 320 and 321.

Prerequisite or Corequisite: Pharmacy 430.

Pharmacy 432—A. J. Anderson (2-0; 2-0)

Pharmaceutics—Dealing in an advanced manner with prescription problems; vehicles and flavoring agents; emulsions and emulsifying agents; external preparations; buffering and isotonicity; parenteral preparations; anti-oxidants and preservatives; cosmetics.

Pharmacy 433. (0-3; 0-3)

Pharmaceutics Laboratory—Exercises in the techniques, equipment and materials of modern dispensing; evaluation and selection of vehicles; use of emulsifying agents; preparation and evaluation of formulations in selected texts and journals; cosmetic preparations.

Textbooks: Martin, *Husa's Pharmaceutical Dispensing,* 5th Edition; Spalton, *Pharmaceutical Emulsions and Emulsifying Agents.*

References: Remington's *Practice of Pharmacy;* Martin, *Physical Pharmacy;* Harry, *Cosmetics, Their Principles and Practice;* Martindale, *The Extra Pharmacopoeia,* Vol. I and II; The United States Dispensatory; Scoville, *The Art of Compounding.*

Prerequisites: Pharmacy 322 and 323.

Prerequisite or Corequisite: Pharmacy 432.

Pharmacy 434—A. J. Anderson (2-0; 0-0)

Forensic Pharmacy—A study of the provincial and federal legislation affecting the practice of pharmacy.

Pharmacy 436—M. J. Huston and K. H. Palmer (3-0; 3-0)

Pharmaceutical Chemistry—A study from the chemical and pharmacological point of view of substances of both synthetic and nautral origin used in medicine or used in the preparation of medicinals.

Textbooks: Sykes, *Mechanism in Organic Chemistry;* Fieser and Fieser, *Advanced Organic Chemistry or* Cram and Hammond, *Organic Chemistry,* 2nd edition; *New and Non-Official Drugs.*

References: Fieser, *Topics in Organic Chemistry;* Burger, *Medicinal Chemistry,* 2nd edition; Soine and Wilson, *Rogers' Inorganic Pharmaceutical Chemistry.*

Pharmacy 440—B. E. Riedel (3-0; 3-0)

Advanced Pharmaceutical Analysis—Advanced chemical and physical methods of analysis; the application of modern instrumental methods.
Prerequisites: Pharmacy 430 and 431.

Pharmacy 441 (0-3; 0-3)

Advanced Pharmaceutical Analysis Laboratory—Analytical problems; instrumental methods of analysis.

Pharmacy 442—A. J. Anderson and J. N. Hlynka (1-0; 1-0)

Advanced Pharmaceutics—Manufacturing pharmacy; physico-chemical principles involved in bulk manufacturing and preparation of sterile products.
Prerequisites: Pharmacy 432 and 433.

Pharmacy 443 (0-3; 0-3)

Advanced Pharmaceutics Laboratory—Experience in formulations to demonstrate the principles covered in the lectures.

Pharmacy 444—M. J. Huston and Mrs. A. Sim (3-0; 3-0)

Pharmaceutical Therapeutics—A study of the role of drugs in the treatment of disease; medical terminology.
Prerequisite: Pharmacology 431.

Pharmacy 446—W. W. Maday (1-0; 1-0)

Hospital Pharmacy—Principles of operation and management of a hospital pharmacy.
Prerequisites: Pharmacy 432 and 433.

Pharmacy 447 (0-4; 0-4)

Hospital Pharmacy Laboratory—Practice in the operation of a hospital pharmacy, to demonstrate the principles covered in the lectures.
Corequisite: Pharmacy 446.

Pharmacy 448—D. M. Cameron (2-0; 2-0)

Pharmacy Management—A study of the principles involved in the successful conduct of the profession of pharmacy.

Pharmacy 449—Staff (1S-3; 1S-3)

Thesis—The preparation and presentation of a report based on an experimental problem or a literature survey.

Pharmacy 450—K. H. Palmer (3-0; 3-0)

Advanced Pharmacognosy—A detailed study of the macro- and microscopical characters of crude drugs. Quantitative methods of drug evaluation. An introduction to the mechanisms of biogenesis of natural products.

Pharmacy 451 (0-3; 0-3)

Advanced Pharmacognosy Laboratory—The macro- and microscopical identification and quantitative examination of crude drugs.

Graduate Courses

Pharmacy 501—B. E. Riedel (3-3; 0-0)

Isotope Tracer Methodology—Lectures: A study of the fundamental principles of radioactivity. The importance of radioisotopes in medicine, agriculture, industry and in research. Discussion of the problems and limitations in the use of radioisotopes as tracers. Instrumentation and analysis methods. Health and safety precautions.

Laboratory: Handling and preparation of radioisotopes for counting. Counting procedures. Tracer chemical and biochemical analyses.
Textbook: Kamen, M. D., *Radioactive Tracers in Biology*, (Academic Press Inc., New York, N.Y.).

Pharmacy 502—B. E. Riedel (0-0; 3-3)

Radioisotopes—Lectures: Application of radioactive isotopes to biochemical problems in research, diagnostic medicine, agriculture and industry. Experimental procedures, application of methods of analysis, and criteria for evaluation of results.

Discussion of newer applications and methods reported in the literature. Laboratory: A practical project involving the use of one of the available radioactive isotopes in the field of interest to the student.
Prerequisite: Pharmacy 501.

Pharmacy 503—B. E. Riedel (0-0; 3-3)

Medical Application of Radioisotopes—(a) Lectures: A study of the application of radioisotopes in medical diagnosis and treatment; control of radioisotopes in the hospital; consideration of radiation hazards. (b) Laboratory: Experience in handling radioisotopes used in medicine.
Prerequisite: Pharmacy 501.

Pharmacy 504—L. G. Chatten (3-0; 0-0)

Structure-Action Relationships of Organic Medicinals—Relationship between chemical structure and biological action of organic medicinal agents. The course deals primarily with systemic and local anti-infectives, antifungal agents, anthelmintics and parasiticides.

Pharmacy 506 (1S-0; 1S-0)

Graduate Seminar—Reports on topics related to the fields of specialization of the graduate student.

PHYSICAL EDUCATION

First-year students are required to register in Phys. Ed. 218—Men or Phys. Ed. 228—Women.

Phys. Ed. 218—Physical Education Staff (0-2; 0-2)

Recreational Activities—(Men)—Emphasis on the fundamentals of the following recreational and fitness activities: circuit training, aquatics, handball, badminton, volleyball, tumbling and apparatus.

Phys. Ed. 228—Physical Education Staff (0-2; 0-2)

Recreational Activities—(Women)—Emphasis on the fundamentals of the following recreational and fitness activities: aquatics, movement fundamentals, tennis, badminton, dance and golf.

PHYSIOLOGY

Physiology 361—K. M. Chapman, W. H. Cottle and Staff (3-2; 3-2)

Elementary Human Physiology—This course comprises the essentials of human physiology, and the laboratory program is designed to illustrate principles of animal function. This course will normally be taken by students in the Faculties of Pharmacy and Physical Education but may also be taken by students in other Faculties. Credit must be obtained for laboratory work to allow a passing grade for the course

Prerequisites: Zoology 220 or 225 or Biology 130 or 230; Chemistry 250 or 350.
Textbook: Winton and Bayliss, *Human Physiology*, 5 ed., 1962.

VETERINARY SCIENCE

Vet. Sci. 404—J. G. O'Donoghue (1-0; 1-0)

Veterinary Science—Veterinary biologicals; general sanitary measures for control of animal and poultry diseases; review of deficiency ailments; prevalent animal diseases with reference to recent pharmaceutical preparations and biological products used in treatment and prevention; some common sporadic ailments of farm animals and their remedies.

XIX

The Faculty of Physical Education

INFORMATION, REGULATIONS, COURSES

INTRODUCTION

A School of Physical Education was organized under General Faculty Council in 1954. The degree course in Physical Education has been offered since 1950. The program originally led to the degree of Bachelor of Education in Physical Education, which has been superseded by the degree of Bachelor of Physical Education. Effective April 1, 1964 the School became the Faculty of Physical Education.

Only the first two years of this course are offered at Calgary.

The faculty also offers a four-year program leading to the degree of Bachelor of Arts in Recreation Leadership.

In addition to these two programs, the Faculty provides instruction in teaching methods in both health and physical education for students in the Faculty of Education, conducts service classes (required) for first-year students in all faculties, organizes and supervises intramural programs and acts in an advisory capacity for the intercollegiate athletic programs.

Students holding the degree of B.P.E. or its equivalent may undertake graduate study in physical education leading to the degree of Master of Arts or Master of Science. The Calendar of the Faculty of Graduate Studies should be consulted.

Professional Opportunities

The demand for qualified people in both the fields of physical education and recreation continues to increase each year, far exceeding the supply.

Teacher Education

The Faculty of Physical Education is responsible for courses in health and physical education offered to students in the Faculty of Education.

A major in physical education is offered to students in the elementary route. Those in the secondary route may elect to enroll in two optional courses in physical education. Normally, teachers qualifying to teach physical education in the secondary schools will be expected to complete the Bachelor of Physical Education degree before enrolling in the Faculty of Education.

All first year students registered in the Faculty of Education are required to enroll in Phys. Ed. 218 or 228.

***Dress*: The prescribed gymnasium costume is:**

Women	*Men*
Shorts (dark green)	Shorts
Sports blouse (white)	T-shirts
Socks (white)	Socks (white)
Running shoes	Running shoes

The Service Program

It is the aim of the Faculty of Physical Education to make a major contribution toward the physical, mental and social life of each student through instruction and participation in physical recreational activities.

All first-year students are required to take two hours of physical education each week. Those excepted from this regulation are:

1. Students declared physically unfit by the University Health Services,
2. Students over 25 years of age.

Individual lockers, towels and shower facilities are available for all students. The program is conducted in the Physical Education Building.

Dress: The required gymnasium costume is identical to the one outlined in the foregoing section, "Teacher Education".

For details of courses offered in the Service Program, see DETAILS OF COURSES—V.

The Intramural Program

The Faculty of Physical Education, with the cooperation of the University Athletic Board, organizes and administers a comprehensive program of intramural sports. Primary purposes of the program are to develop recreational skills and to encourage sportsmanship and friendly relations among the students of the University through athletic competition. Individual and group competitive sports for men and women include tennis, golf, track and field, cross-country running, basketball, hockey, volleyball, touch football, swimming and figure skating. Facilities include gymnasia, a swimming-pool, outdoor playing fields and the University ice arena.

Intercollegiate Athletics

As a member of the Western Canada Intercollegiate Athletic Association, the University provides opportunities for men and women to compete in intercollegiate sports. Included in the activities for men are golf, tennis, cross-country, badminton, volleyball, basketball, hockey, wrestling, swimming, football, fencing and curling. Women compete in tennis, golf and badminton and hold two sports weekends with member universities. Basketball and curling are played during one weekend and volleyball, swimming and figure skating during the other.

MATRICULATION REQUIREMENTS

(1) For the Degree of Bachelor of Physical Education

A high school diploma with "B" or higher standing and at least a 60.0% average in the following Grade XII courses:

(a) English 30,
(b) Social Studies 30,
(c) Chemistry 30,
(d) *Three* of: French 30, German 30, Latin 30, (or another language at an equivalent level), Physics 30, Biology 30 (or 32), Mathematics 30.

Note: It is recommended that students planning to register in physical education elect to take Biology 30 or 32 (preferably 30) as one of the three optional courses.

(2) For the Degree of Bachelor of Arts in Recreation Leadership

A high school diploma with "B" or higher standing and at least a 60.0% average in the following Grade XII courses:

(a) English 30,

(b) Social Studies 30,

(c) *Four* of: French 30, German 30, Latin 30 (or another language at an equivalent level), Biology 30 (or 32), Mathematics 30, *Mathematics 31, Music 30.

---

*Acceptable option if credit obtained by Departmental examination during or after June, 1962.

These general regulations notwithstanding, the University may in its discretion refuse admission to any applicant. For example, this regulation normally will be applied where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements of the University of Alberta.

PROGRAMS OFFERED IN THE FACULTY OF PHYSICAL EDUCATION

(1) The Degree of Bachelor of Physical Education

First Year

1. Chemistry 250.
2. English 200 or 210.
3. Psychology 202 or 212.
4. Biology 130 or 230.
5. Physical Education 243: Introduction to Physical Education.
6. Physical Education 205: Activity Course.
7. Physical Education 207: Activity Course.
8. Physical Education 211: Activity Course.
9. Physical Education 215: Activity Course.

Second Year

1. Physiology 361.
2. Physical Education 305: Activity Course.
3. Physical Education 307: Activity Course.
4. Physical Education 311: Activity Course.
5. Physical Education 315: Activity Course.
6. Physical Education 362: Human Anatomy and Kinesiology.
7. Physical Education 371: Prevention and Treatment of Athletic Injuries.
8. Physical Education 375: Tests and Measurements in Health and Physical Education.
9. Physical Education 389. Outdoor School.
10. Physical Education 392: Health Education in Secondary Schools.
11. Two approved Arts or Science options.

Third Year

1. Physical Education 401: Activity Course.
2. Physical Education 403: Activity Course:
3. Physical Education 405 (Women): Activity Course.
4. Physical Education 407 (Women): Activity Course.
5. Physical Education 409 (Men): Activity Course.
6. Physical Education 417 (Men): Activity Course.
7. Physical Education 442: Organization and Administration of Health and Physical Education.
8. Physical Education 452: Community Recreation.
9. Physical Education 467: Preventive and Corrective Physical Education.
10. Physical Education 473: Physiology of Exercise.
11. Physical Education 482: Observation and Practice in Field Work.
12. Two approved Arts or Science options.

A pass mark of 60 per cent is required in all activity courses in the B.P.E. program.

Graduation Requirements

To be granted the B.P.E. degree or the B.A. degree in Recreation Leadership, a student must obtain a passing mark or better in all courses in the final two years of the respective degree program, obtaining an average of 60 percent.

Notes:

i. A student will not be allowed to write more than five supplemental examinations in full courses or the equivalent, for the purpose of obtaining passing marks, or of raising his average to the required 60 percent.

ii. A student will not be allowed to write more than two supplemental examinations in full courses or equivalent in any year. (This regulation may, in exceptional circumstances, be relaxed for first-year students).

iii. A student who repeats a year will be granted no supplemental privileges in the courses taken that year and must pass all courses in the repeated year with a 60 percent average to be allowed to continue.

iv. The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in this Faculty unless by special permission of the Dean.

(2) The Degree of Bachelor of Arts in Recreation Leadership

First Year

1. English 200 or 210
2. Sociology 202
3. Psychology 202
4. Approved Mathematics or Science Option
5. P.E. 205
6. P.E. 215
7. P.E. 243

Second Year

1. Sociology 320
2. Approved Arts or Science Option
3. Art 230 or Education C.I. 213
4. Drama 250
5. P.E. 307
6. Recreation 353—Camp Counselling
7. Recreation 355—Introduction to Community Recreation
8. Recreation 357—Methods and Materials in Recreation Leadership
9. P.E. 389—Outdoor School

Third Year

1. Sociology 450, 460 or Psychology 353 and 383
2. Education C.I. 213 or Art 230
3. Drama 360
4. An approved Arts or Science Option
5. P.E. 401—Activity Course
6. P.E. 403—Activity Course
7. Recreation 455—Recreation Administration
8. Recreation 457—Field Work in Public and Semi-Private Agencies

Fourth Year

1. An approved Sociology or Psychology Option
2. An approved Arts or Science Option
3. Business 250
4. Recreation 458—Principles of Recreation
5. Recreation 459—Planning Recreation Facilities
6. Recreation 465—Community Organization
7. Approved Physical Education Activity Option
8. Approved Physical Education Activity Option

(3) Graduate Study

M.A. or M.Sc. Programs for persons holding the degree of B.P.E. or its equivalent.

The Faculty of Physical Education offers a program leading to the Master of Science Degree or the Master of Arts Degree. Well-equipped facilities are available for a limited number of graduate students. Graduate instruction is offered in the scientific principles, philosophy, and supervision of physical education, and the administration of recreation. Areas of research specialization include physiology of exercise, sociology, psychology of motor learning and history. See the calendar of the Faculty of Graduate Studies.

Course selection will be made in consultation with an adviser appointed by the Graduate Committee of the Faculty of Physical Education. The basic outline includes the following: Physical Education 544, Physical Education 548, or Physical Education 552, Physical Education 567, Physical Education 578, three approved options in related fields, and a thesis.

(4) Teacher Education

Elementary Route Major

1. P.E. 202
2. P.E. 325
3. P.E. 327
4. P.E. 419
5. P.E. 421
6. P.E. 427 or P.E. 433
7. P.E. 431

Secondary Route Options

1. P.E. 232
2. P.E. 332

Secondary Route Options in Health Education

1. P.E. 392
2. P.E. 492

(5) B.Ed. Programs for Graduates in Physical Education

Physical Education students seeking a teaching certificate will take the following courses:

(1) Secondary route:
1. Ed. Adm. 461
2. Ed. Psy. 476*
3. Ed. CI 450
4. Ed. Fdn. 492*
5. Ed. Method, major field
6. Ed. Fdn. 414 or Ed. Psy. 478

Successful completion of these six courses entitles the student to obtain an interim Professional Certificate.

*Students lacking prerequisites for Ed. Psy. 476 and Ed. Fdn. 492 must obtain the prerequisites before taking these courses. They will be eligible to receive the Standard S certificate on satisfactory completion of the prerequisites and the other four courses listed above, and the Interim Professional certificate on satisfactory completion of Ed. Psy. 476 and Ed. Fdn. 492 in addition.

7-11. Five approved courses, at least two of which must be in Education and at least two of which must be in Arts and Science.

Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree.

(2) Elementary route:
1. Ed. Adm. 461
2. Ed. Psy. 476*
3. Ed. CI 400
4. Ed. Fdn. 492*
5. Ed. CI 402
6. Ed. CI 404

Successful completion of these six courses entitles the student to obtain an interim Professional Certificate.

*Students lacking prerequisites for Ed. Psy. 476 and Ed. Fdn. 492 must obtain the prerequisites before taking these courses. They will be

eligible to receive the Standard E certificate on satisfactory completion of the prerequisites and the other four courses listed above, and the Interim Professional certificate on satisfactory completion of Ed. Psy. and Ed. Fdn. 492 in addition.

7-11. Five approved courses, at least two of which must be in Education and at least two of which must be in Arts and Science.

Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree.

DETAILS OF COURSES

NOTE: In the case of courses which are given throughout the winter session, the weekly hours of instruction are set out for both terms. The first figure in each term indicates lecture-hours and the second laboratory-hours, Even-numbered courses are full courses; odd-numbered courses are half courses.

Professors—L. Goodwin (Calgary), M. L. Howell, W. D. Smith, M. L. Van Vliet (Dean of the Faculty)

Associate Professors—*A. F. Affleck, Ruby O. Anderson, Patricia L. Austin, A. W. E. Eriksson, H. J. McLachlin, *S. Mendryk, M. F. R. Smith

Assistant Professors—R. Bratton (Calgary), Audrey M. Carson, J. Dewar (Calgary), C. J. Drake, Shirley Duquette (Calgary), G. Elliott, G. Fracas, Jean Leiper (Calgary), D. deF. Macintosh (Calgary), R. Macnab, R. Morford, P. Reichenbach (Calgary)

Lecturer—S. Robbins

Instructors—P. Conger, D. Darwick, M. Ellis, Donna Enger

---

*On leave of absence 1964-65.

PHYSICAL EDUCATION COURSES

I. BACHELOR OF PHYSICAL EDUCATION

Activity Courses for Men

Physical Education 205—Physical Education Staff (1-2; 0-0)

Activity Course—Theory, practice and teaching of soccer and volleyball

Physical Education 207—Physical Education Staff (1-2; 0-0)

Activity Course—An introduction to the teaching of physical education in the elementary schools.

Physical Education 211—G. Elliott (0-0; 1-2)

Activity Course—Theory, practice and teaching of tumbling and apparatus for men.

Physical Education 215—R. Morford (0-0; 1-2)

Activity Course—Theory, practice and teaching of aquatics with emphasis on fundamental skills and stroke techniques.

Physical Education 305—Physical Education Staff (1-2; 0-0)

Activity Course—Theory, practice, teaching and coaching of basketball.

Physical Education 307—A. Carson (1-2; 0-0)

Activity Course—Theory, practice and teaching of folk and social dance.

Physical Education 311—G. Elliott (0-0; 1-2)

Activity Course—Theory, practice and teaching of gymnastics for men. Emphasis on class organization and teaching methods.

Prerequisite: Physical Education 211.

Physical Education 315—M. F. R. Smith (0-0; 1-2)

Activity Course—Advanced aquatics with emphasis on swimming and diving instruction, coaching, and organization of programs.

Prerequisite: P.E. 215 or equivalent.

Physical Education 389—W. D. Smith and Staff (80 hours)

Outdoor School—Theory, practice and teaching of tennis, archery, golf and Outdoor Education. Fundamental skills of touch football, borden ball and speedball.

Physical Education 401—G. Elliott (1-2; 0-0)

Activity Course—Theory, practice and teaching of track and field with emphasis on coaching techniques, organization and officiating of meets.

Physical Education 403—L. J. Fournier (0-0; 1-2)

Activity Course—Theory, practice and teaching of badminton, curling and skiing.

Physical Education 409—C. J. Drake, G. Fracas (0-0; 1-2)

Activity Course—Theory, practice, teaching and coaching of hockey and wrestling.

Physical Education 417—G. Fracas (1-2; 0-0)

Activity Course—Theory, practice, teaching and coaching of football.

Activity Courses for Women

Physical Education 205—J. Smith (1-2; 0-0)

Activity Course—Theory, practice and teaching of soccer and volleyball.

Physical Education 207—Physical Education Staff (1-2; 0-0)

Activity Course—An introduction to the teaching of physical education in the elementary schools.

Physical Education 211—D. Enger (0-0; 1-2)

Activity Course—Theory, practice and teaching of gymnastics.

Physical Education 215—P. Conger (0-0; 1-2)

Activity Course—Theory, practice and teaching of aquatics with emphasis on fundamental skills and stroke techniques.

Physical Education 305—R. Anderson (1-2; 0-0)

Activity Course—Theory, practice, teaching and coaching of basketball.

Physical Education 307—A Carson (1-2; 0-0)

Activity Course—Theory, practice and teaching of folk and social dance.

Physical Education 311—D. Enger (0-0; 1-2)

Activity Course—Theory, practice and teaching of gymnastics. Emphasis on class organization and teaching methods.

Prerequisite: Physical Education 211.

Physical Education 315—Physical Education Staff (0-0; 1-2)

Activity Course—Advanced aquatics with emphasis on swimming and diving instruction, coaching, and organization of programs.

Prerequisite: P.E. 215 or equivalent.

Physical Education 389—W. D. Smith and Staff (80 hours)

Outdoor School—Theory, practice and teaching of tennis, archery, golf and Outdoor Education. Fundamental skills of field hockey.

Physical Education 401—A. Carson (1-2; 0-0)

Activity Course—Theory, practice and teaching of track and field with emphasis on coaching techniques, organization and officiating of meets.

Physical Education 403—R. Anderson (0-0; 1-2)

Activity Course—Theory, practice and teaching of badminton, curling and skating.

Physical Education 405—P. Austin (0-0; 1-2)

Activity Course—The study of techniques, improvisation and composition of modern dance.

Physical Education 407—R. Anderson (1-2; 0-0)

Activity Course—Comprehensive study of international folk dance.

Theory Courses for Men and Women

Physical Education 243—W. D. Smith and Staff (3-0; 3-0)

Introduction to Physical Education—A survey of the field of physical education with emphasis on factual information directed toward the development of a scientific program of physical education. This course will include a brief study of the history of physical education as well as underlying philosophies.

Physical Education 362—H. J. McLachlin (2-2; 2-2)

Human Anatomy and Kinesiology—Gross anatomy; the skeletal and muscular structure, the circulatory, digestive and neural systems and their functionings in activities relating to physical education. Analysis of complex movements, specialized skills and motor co-ordination in terms of the mechanics of skeletal and muscular movements.

Physical Education 371—H. J. McLachlin (0-0; 1-2)

Prevention and Treatment of Athletic Injuries—Theoretical and practical experience in massage, elementary physiotherapy, and preventive techniques.

Physical Education 375—W. D. Smith (1-2; 0-0)

Tests and Measurements in Health and Physical Education—Criteria for selection of tests and the place and potential use of measurement in fields of health and physical education. Study of current tests from both practical and theoretical standpoints. Use of tests in the administration of physical activity programs.

Physical Education 392—A. W. E. Eriksson (3-0; 3-0)

Health Education in Secondary Schools—Personal and environmental school health with special emphasis on methods and materials in health instruction.

Physical Education 442—W. D. Smith and Staff (3-0; 3-0)

Organization and Administration of Health and Physical Education—An analysis of factors involved in planning, directing, staffing, co-ordinating, budgeting and reporting with respect to comprehensive junior and senior high school programs in health instruction, the required program, intramural sports and interscholastic athletics.

Physical Education 452—L. J. Fournier (3-0; 3-0)

Community Recreation—A study of the philosophy, principles and practices of recreation applied to problems of organization, administration and supervision on a local, provincial and national basis.

Physical Education 467—P. Austin (2-2; 0-0)

Preventive and Corrective Physical Education—A study of postural and functional defects in relation to posture and health. Theory and practice of corrective and preventive exercise adapted to individual needs.

Prerequisites: Phys. Ed. 392, 362.

Physical Education 473—R. Macnab (0-0; 2-1)

Physiology of Exercise—Physiological effects of muscular exercise, physical conditioning and training. Significance of these effects for health and for performance in activity programs.

Prequisite: Physiology 361.

Physical Education 482—W. D. Smith and Staff (0-3; 0-3)

Observation and Practice in Field Work—Field work experience in teaching, officiating, recreation and intramural programs. Preparation of graduation essay.

II. BACHELOR OF ARTS IN RECREATION LEADERSHIP

Physical Education 205

Activity Course—see B.P.E. courses.

Physical Education 215

Activity Course—see B.P.E. courses.

Physical Education 243

Introduction to Physical Education—see B.P.E. courses

Physical Education 307

Activity Course—see B.P.E. courses.

Recreation 353 (0-0; 3-0)

Camp Counselling—Fundamentals of camping, recruitment and selection of camp staff, development of the counsellor training program, supervision and evaluation of camp personnel.

Recreation 355 (3-0; 0-0)

Introduction to Community Recreation—History of recreation movement, theories of play, public and private agency administration.

Recreation 357 (0-0; 1-2)

Methods and Materials in Recreation Leadership—Techniques in skill, instruction, conduct of clinics and public meetings, and social recreation.

Physical Education 389

Outdoor School

Physical Education 401

Activity Course (Men and Women)—see B.P.E. courses.

Physical Education 403

Activity Course (Men and Women)—see B.P.E. courses.

Recreation 455 (3-0; 0-0)

Recreation Administration—Public, private and school recreation administrative procedures relative to planning programs, facilities and sites; directing; staffing; coordinating; budgeting and reporting.

Recreation 457 (0-0; 1-3)

Field Work in Public and Semi-Private Agencies—Prerequisites: Recreation 355 and Recreation 357 or consent of the instructor.

Recreation 458 (3-0; 3-0)

Principles of Recreation—A critical study of selected psychological, sociological and educational theories with the view of formulating a rationale upon which recreational leadership methods and administrative decisions may be based.

Recreation 459 (0-0; 3-0)

Planning Recreation Facilities—Prerequisites: Recreation 355 and Recreation 455 or consent of instructor.

Recreation 465 (3-0; 0-0)

Community Organization—The analysis of the social and political processes through which groups and individuals work together to mobilize resources and establish relationships.

III. GRADUATE COURSES

Physical Education 544 (3-0; 3-0)

Current Problems in Physical Education and Recreation—A review of the development of specialized areas in physical education and recreation. A case method study of organizational and administrative practices in various aspects of recreation and physical education.

Physical Education 548 (3-0; 3-0)

Scientific Principles of Physical Education—The application of scientific principles to problems of fitness, fundamental movement and program development. Emphasis will be in the areas of physiology of exercise, applied anatomy and kinesiology and new developments in injury prevention and treatment.

Physical Education 552 (3-0; 3-0)

Administration of Recreation—The administration of programs of recreation to include planning, organizing, directing, co-ordinating and controlling. Municipal, provincial and federal legislation governing recreation.

Physical Education 567 (0-0; 3-0)

Seminar in Human Motor Performance—A study and discussion in depth of the research literature pertaining to selected factors in motor performance.

Prerequisite: Psychology 468.

Physical Education 578 (3-3; 3-3)

Research Methods in Health, Physical Education and Recreation—Methods, techniques and tools of research. A study of the various approaches to research areas in health, physical education and recreation with special reference to recent developments in the field of tests and measurements.

IV. PHYSICAL EDUCATION COURSES FOR FACULTY OF EDUCATION STUDENTS

Physical Education 202 (3-3; 3-3)

Introduction to Elementary School Physical Education—A study of children at play. Movement education leading to the development of skill in various fields of physical activity.

Physical Education 232 (3-3; 3-3)

Physical Education Curriculum and Instruction (Secondary)—Planning and teaching secondary school physical education with emphasis on basic activities and intramural athletics.

Physical Education 325 (3-0; 0-0)

Elementary Anatomy and Physiology of Exercise—Prerequisite: P.E. 200 or 202.

Physical Education 327 (0-0; 0-3)

Educational Dance—A study of the basic principles of movement and the use of these in the communication of ideas and feelings.

Prerequisite: P.E. 200 or 202 or consent of department.

Physical Education 332 (3-3; 3-3)

Principles of Physical Education (Secondary)—Analysis of factors derived from foundation sciences and philosophies as they affect activity selection and basic objectives at the secondary school level. Laboratory experiences include track and field, dance and gymnastics.

Physical Education 337 (1-2; 0-0)

Physical Education Curriculum and Instruction—Methods and materials in the teaching of elementary school health and physical education.

Physical Education 392 (3-0; 3-0)

Health Education in Secondary Schools—Personal and environmental school health with special emphasis on methods and materials in health instruction.

Physical Education 419 (0-0; 3-0)

Problems and Trends in Elementary School Health and Physical Education—Prerequisites: P.E. 200 or 202 and P.E. 329.

Physical Education 421 (3-2; 0-0)

Individual and Team Activities—Prerequisite: P.E. 200 or 202.

Physical Education 427 (3-2; 0-0)

Principles of Gymnastics—Introduction to the use of apparatus, stunts and tumbling.

Physical Education 431 (0-0; 1-2)

Swimming—Methods of teaching beginning swimming and diving.

Prerequisites: P.E. 200 or 202 and Junior Red Cross Swimming Award or equivalent.

Physical Education 433 (3-3; 0-0)

Advanced Educational Dance and Dance Drama—In addition to the practical work, students will be expected to undertake an independent study.

Physical Education 436 (6L; 6L)

Activity Course—Theory, practice and teaching of aquatics, gymnastics, badminton, curling. Skiing, hockey and wrestling (Men); skating and modern dance (Women).

Comprises: P.E. 215, 311, 403, 405, 409.

Physical Education 442

Organization and Administration of Health and Physical Education—See B.P.E. courses.

Prerequisites: P.E. 200 or 202 and P.E. 327.

Physical Education 492 (3-2; 3-2)

Community Health—Consideration of current research of disease concepts and examination of community attitudes and pressures affecting health education. Field research includes hospitals, clinics, institutions and schools.

V. THE SERVICE PROGRAM

(Required of all first-year students.)

Physical Education 218—Physical Education Staff (Men) (0-2; 0-2)

Recreational Activities—Emphasis on the fundamentals of the following recreation and fitness activities: circuit training, aquatics, handball, badminton, volleyball, tumbling and apparatus.

Physical Education 226—Physical Education Staff (Women) (2-0; 2-0)

Physiotherapy Service Program—This course will include rhythmics, gymnastics, active games and dancing, suitable for all age groups. It will also include swimming and water safety techniques with emphasis on their use in the treatment of patients. (For students in the School of Rehabilitation Medicine.)

Physical Education 228—Physical Education Staff (Women) (0-2; 0-2)

Recreational Activities—Emphasis on the fundamentals of the following recreational and fitness activities: aquatics, movement fundamentals, tennis, badminton, dance and golf.

COURSES OFFERED BY OTHER DEPARTMENTS

ART

Art 230 (1-4; 1-4)

Fundamentals of Design—The study and practical application of principles of composition and picture-making, methods of construction in design, and the use of conventional and abstract forms.

Art 240 (3-3; 3-3)

Fundamentals of Drawing—Theory and practice of drawing; analysis of masters' drawings; study of line, form, pattern, light and shade; portrait and figure construction; life drawing, using both long and quick poses.

BIOLOGY

Biology 130 (3-3; 3-3)

Introductory Biology—An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

Biology 230 (3-3; 3-3)

Plant Form and Function—Comparative morphology and physiology of plants at an intermediate level. 1st Term or 2nd Term.

Comparative Zoology—Animal morphology, physiology and development at an intermediate level. 2nd Term or 1st Term.

Prerequisite: Biology 30 or 130.

BUSINESS

Business 250 (3-0; 3-0)

Business Principles—Survey of the functional areas of business.

CHEMISTRY

Chemistry 250 (3-3; 3-3)

Organic Chemistry—Lectures: An introduction to a study of the compounds of carbon.

Laboratory: The preparation of some organic compounds.

Textbooks: Fieser and Fieser, *Organic Chemistry* or Noller, *Textbook of Organic Chemistry*.

Prerequisite: Chem. 130 or Chem. 30 or equivalent.

ENGLISH

English 200 (3-0; 3-0)

A Survey of English Literature from Chaucer to the Twentieth Century—A close study of representative masterpieces. Essays and tests of the prescribed literature will be given to afford practice in setting down ideas in good English.

Authors: Chaucer, More; Shakespeare, Jonson, Milton; Defoe, Pope, Swift; Wordsworth, Keats, Brontë, Tennyson, Browning; Yeats or Eliot, O'Casey or Shaw, Golding or Orwell. Other required reading: *Everyman* and appropriate selections of lyric verse.

English 210 (3-0; 3-0)

English Language and Literature—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

Texts: To be announced.

EDUCATION

Education CI 213 (3L; 0-0) or (0-0; 3L) or (1½L; 1½L)

Curriculum and Instruction in Elementary School Music.

FINE ARTS

Drama

Drama 250 (3-1; 3-1)

Elementary Acting and Stagecraft—

(a) Acting—

Practical and theoretical improvisation, stage performance and discussion. Emphasis is placed on the development of the actor through preparation for a role, acting scenes, and basic speech and body work. Elementary makeup.

(b) Practical work in acting and technical practice.

Drama 360 (3-0; 3-0)

Voice and Speech—This is an introductory course in speech with emphasis upon oral interpretation. The first session will be devoted to a discussion of the importance of our spoken language, a study of the vocal mechanism and causes of poor phonation, and practice in the production of voice and speech. The second session will be concerned with the expression of personality through speech, audience psychology, oral interpretation and practice. Some reference will be made to other speech situations.

Before registering in this course, students must obtain the consent of the instructor.

PHYSIOLOGY

Physiology 361 (3-2; 3-2)

Elementary Human Physiology—This course comprises the essentials of human physiology, and the laboratory program is designed to illustrate principles of animal function.

Credit must be obtained for laboratory work to allow a passing grade for the course.

Textbook: Winton and Bayliss, *Human Physiology*, 5 Ed., 1962.

Prerequisites: Zoology 220 or 225, Chemistry 250 or 350.

PSYCHOLOGY

Psychology 202 (3-0; 3-0)

Introduction to General Psychology—A survey of problems ,methods and principles in various fields of psychology.

Psychology 212 (3-0; 3-0)

General and Developmental Psychology—A survey of problems, methods and principles in several fields of psychology, with particular emphasis on child, adolescent and adult development and behaviour.

SOCIOLOGY

Sociology 202 (3-0; 3-0)

Introductory Sociology—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior.

Sociology 320 (3-0; 3-0)

Social Problems—An analysis of deviant behavior (e.g. crime, juvenile delinquency, drug addiction) and an analysis of social disorganization including world population crisis, urban and rural problems, industrial and other problems.

Sociology 450 (3-0; 3-0)

The Human Community—A study of human communities; their institutional structure, ecological factors associated with patterns of growth, community relations, community planning.

Prerequisite: A first course in Sociology.

Sociology 460 (3-0; 3-0)

Social Organization—Theories of social organization, analysis of such forms of social organization as kinship groups, bureacracy, economic system, science, etc., and their inter-relationship in functioning social systems.

Prerequisite: A first course in sociology.

XX

The School of Rehabilitation Medicine

All enquiries regarding admission to the School of Rehabilitation Medicine, University of Alberta, should be addressed to:

Director,
School of Rehabilitation Medicine
University of Alberta, Edmonton

INFORMATION, REGULATIONS, COURSES

(1) INTRODUCTION

The training in rehabilitation procedures has been established to provide professional personnel, who, under the direction of the medical profession, will aid in the recovery and re-establishment of disabled people suffering from physical and mental disorders.

Licensing

A graduate from this institution will be qualified to serve in Provincial and General hospitals, Mental Institutions, Clinics, Armed Services and in private practice. He or she will be eligible to register with the parent Canadian professional organizations and may expect reciprocity in England, the Commonwealth and the International organizations in Physical Therapy and Occupational Therapy. Graduates intending to practise outside Alberta will have to comply with the local state or provincial licensing requirements regardless of their professional qualifications. Those planning to practise outside Alberta may seek further information from:

1. (a) The Canadian Physiotherapy Association,
   64 Avenue Road, Toronto 5, Ontario.
   (b) The Canadian Association of Occupational Therapists,
   331 Bloor Street West, Toronto 5, Ontario.
2. In England:
   (a) The Chartered Society of Physiotherapy,
   Tavistock House (South),
   Tavistock Square, London, Wc 1, England
   (b) The Association of Occupational Therapists,
   251 Brompton Road,
   London, S.W. 3, England.
3. In the United States:
   (a) The American Physical Therapy Association,
   1790 Broadway, New York 19, N.Y.
   (b) The American Occupational Therapy Association,
   250 W 57th St., New York, 19, N.Y.
4. Other countries:
   Information may be obtained from the Canadian Physiotherapy Association and Canadian Association of Occupational Therapists, Toronto.

Association Membership

The Canadian Physiotherapy Association and the Canadian Association of Occupational Therapists have special post-graduate internship requirements for diploma students from all Canadian Universities, and the graduate will be required to make up these necessary hours under the direction of the professional body concerned before professional registration can be obtained.

Diploma Programs in Physical Therapy and Occupational Therapy

The diploma programs comprise a three year curriculum consisting of organized courses in the basic sciences of Anatomy, Physiology and Biology as well as English, Psychology, and professional courses in Medicine, Surgery, Psychiatry and Rehabilitation procedures.

In the second year the student will be required to intern in approved Alberta institutions under the supervision of qualified physiotherapists and occupational therapists. Provision is made for the payment of an honorarium by the hospital or clinic where the students extern during the summer months.

In the first two years of the three year programs some material will be common to both classes of students whether they intend to practise Physical Therapy or Occupational Therapy. This has been done in order to give the student a more basic background as well as a realistic and practical approach to the overall field of Rehabilitation. At the end of the first three months the student will decide which field he or she intends to pursue and will confirm his or her registration in either Physical Therapy or Occupational Therapy.

(2) ADMISSION REQUIREMENTS

A candidate for admission to the first year of the diploma course must have reached her seventeenth birthday on or before the 1st of October. Only under exceptional circumstances will a candidate be admitted under the age of 17 or over the age of 35 years.

Male students are accepted.

Applicants will be required to submit a certificate of physical fitness from the attending physician. A student registered in first year will be required to have a chest x-ray and submit to a tuberculin test.

The applicant will be required to have Senior Matriculation or its equivalent, including "B" or higher standing in each of the following subjects:

English 30 — Social Studies 30
Chemistry 30 — Mathematics 30
one of Physics 30 or Biology 30 or 32 (Biology 30 preferred)
and one of *Mathematics 31 or Foreign Language 30

The student must have an average standing of 60% or higher in these courses.

The following will be the pre-requisites for entrance to this school, effective in the 1966-67 session:

English 30
Social Studies 30
Mathematics 30
Biology 30
One of Physics 30 or Chemistry 30
One of Foreign Language 30 or Mathematics 31

---

*Acceptable if credit obtained by means of a Departmental examination during or after June, 1962.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain nominal entrance requirements at the University of Alberta.

In the event that high school education was received outside of Alberta or was completed prior to 1954—documentary evidence of academic record should be submitted for comparison with the present Alberta requirements.

Candidates must have satisfactory personality and physique and must meet the health and physical requirements of the University Health Services for the course in Physical or Occupational Therapy.

The course is limited to forty students per year. It is open on equal terms to applicants from Alberta and from outside the province. In all cases, preference will be given on the basis of academic standing.

All applicants will be required to arrange for an interview with the school director prior to registration. A passport-size photograph must accompany each application.

Registration

Enrolment will take place on the dates in September shown in the Academic Schedule. Each applicant accepted for admission to the first year of the course will receive a card of admission which will indicate the day and time at which the applicant must attend at the University for registration.

A medical certificate form, which is obtained from the Registrar at the same time as the application form, must be completed and signed by the applicant's family physician and must accompany the application form when it is returned to the Registrar.

Budget

An estimated annual budget in the neighborhood of $1,350 would be required by a student who is not able to live at home. This includes room and board, books, tuition fees, student fees, travelling expenses, and other incidentals.

Uniforms

In their first year students will be expected to provide a short-sleeved white cotton blouse, (T-shirt for male students), green shorts, white running shoes and white socks, and subsequently two white uniforms of special design, white stockings and a pair of white oxfords, (long coats for male students).

Throughout the course a small charge will be made for Occupational Therapy materials used by the student. Over the first two years of the course this will total approximately $20.00.

Educational and Clinical Facilities

Undergraduates in the second and third years of the three-year diploma course will receive instruction in the following institutions:

University of Alberta Hospital,
Workmen's Compensation Board Rehabilitation Clinic,
Royal Alexandra Hospital,
Oliver Mental Hospital,

Ponoka Mental Hospital,
and other approved medical centres when indicated.

During undergraduate internship in an approved institution, the student may expect to receive from the institution, in lieu of room and board, an honorarium which is at present not less than $50.00 per month.

(3) REQUIREMENTS FOR PROMOTION AND GRADUATION

Students are subject to the regulations found elsewhere in this calendar.

Students will be promoted in terms of the following policies:

The Council, School of Rehabilitation Medicine, will review the records, in theory and practice, of students at the end of each academic year. Recommendation for promotion and graduation will be based on fulfilment of the following requirements:

1. A grade of at least 50% in each subject and an over-all average of 60%.
2. Satisfactory completion of the required number of hours in summer and winter clinical training.

A supplemental is granted in not more than two subjects provided the over-all average is 60%. The pass mark for supplemental examinations is 50% in all courses.

When a student fails to meet the 60% standard set by the School of Rehabilitation Medicine the student's record is carefully considered by the Council of the School, which may, depending upon the circumstances, allow the student to repeat the year or require withdrawal from the School.

For the purpose of reaching an average mark in the work of each year, a scheme for determining a weighted average has been adopted. A notice outlining the basis on which this is done will be posted during the session.

STAFF:—

Professor—M. T. F. Carpendale

Assistant Professors—L. G. Allbon, Ruth O. F. Bradshaw, A. G. Faulds

Lecturers—Elizabeth F. Rowand, Esmé Dardier

Sessional Lecturers—J. R. Fowler, Mrs. Jean Clarke

Members of the Departments of—Anatomy, Botany, English, Medicine, Nursing, Obstetrics and Gynaecology, Pathology, Physiology, Psychiatry, Psychology, Surgery and Zoology.

OCCUPATIONAL THERAPY PROGRAMME

First Year

Subject	Course No.	Hours
*Anatomy	Anatomy 200	208
*Biology	Biology 130 or 230	156
*English	English 210	78
Occupational Therapy	Occupational Therapy 200	104
*Physical Education	Physical Education 226	52
Psychology	Psychology 212	78
*Rehabilitation	Rehabilitation 200	78
	TOTAL	754

Giving a 28 hour week in the first term ,and a 30 hour week in the second term.

Second Year

Subject	Course No.	Hours
*Applied Anatomy	Applied Anatory 300	52
Hospital Internship	Hospital Internship 301	234
*Medicine and Surgery	Medicine and Surgery 300	52
Occupational Therapy	Occupational Therapy 300	182
*Physiology	Physiology 261/361	156
*Psychiatry	Psychiatry 300	26
Sociology	Sociology 202	78
	TOTAL	780
	Hospital Internship 301	480
	TOTAL	1260

Giving a 30 hour week throughout the year.

Third Year

Subject	Course No.	Hours
Applied Anatomy	Applied Anatomy 401	26
*Clinical Neuro-Physiology	Clinical Neuro-Physiology 400	52
*Clinical Therapeutics	Clinical Therapeutics 400	52
Hospital Internship	Hospital Internship 401	260
Occupational Therapy	Occupational Therapy 400	91
Occupational Therapy	Occupational Therapy 401	247
Psychiatry	Psychiarty 400	52
*Speech Therapy	Speech Therapy 400	26
	TOTAL	806

Giving a 31 hour week throughout the year.

CALENDAR COURSE DETAILS—OCCUPATIONAL THERAPY

***Anatomy 200** (3-5; 3-5)

Lectures and demonstrations covering the gross and microscopic structures of the human body, with emphasis on the skeletal, muscular and nervous systems. The course will include surface anatomy and identification of underlying structures by inspection, palpation and movement.

***Biology 130** (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

***Biology 230** (3-3; 3-3)

Plant form and function. Comparative morphology and physiology of plants at an intermediate level.
Comparative Zoology. Animal morphology, physiology and development at an intermediate level.
Prerequisite: Biology 30 or 130.

***English 210** (3-0; 3-0)

A course designed to increase appreciation of good literature and afford practice in setting down ideas in good English.

Occupational Therapy 200 (0-0; 2-6)

A lecture-laboratory series to include the history and development of Occupational Therapy and its present day role in Rehabilitation. Instruction in some basic Therapeutic Activities used in the physical and psychiatric fields.

Textbook: Dept. of the U.S. Army Tech. Manual *Occupational Therapy.*

***Physical Education 226** (0-2; 0-2)

This course will include rhythmics, active games and dancing suitable for all age groups. It will include swimming and water safety techniques.

***Psychology 212** (3-0; 3-0)

A survey of problems, methods and principles in several fields of Psychology, with particular emphasis on child, adolescent and adult development and behaviour.

***Rehabilitation 200** (1-5; 0-0)

An introduction to the basic principles of Physical and Occupational Therapy, including field trips to Industrial and Rehabilitation Units in the city. An elementary course in First Aid will be presented by a member of the St. John's Ambulance Corps.

Second Year

***Applied Anatomy 300** (0-2; 0-2)

A review of the basic Anatomy taught in the first year, with dissection of the human body.

Hospital Internship 301 (0-9; 0-9)

An introduction to the practical application of Occupational Therapy techniques on patients suffering from various physical and psychological diseases, in various local approved institutions.

***Medicine and Surgery 300** (2-0; 2-0)

A series of lectures on the common diseases met within the Rehabilitation Department, to include:

(a) **Gross Pathology:** Inflammation, repair, degeneration and surgical and medical pathology.

(b) **Medical Conditions:** The Arthritides, Cardio-vascular and other medical conditions.

(c) **Orthopaedic Problems:** Traumatic conditions in bone, joint and muscle; diseases of the skeletal system, etc.

(d) **General Surgical Conditions:**

Occupational Therapy 300 (2-5; 2-5)

A continuation of Occupational Therapy 200 with the introduction of further training in therapeutic activities as applied in the treatment of psychiatric illness and physical disabilities. Special emphasis will be placed on the training of patients in mastering Activities of Daily Living in keeping with their disability. A short series of lectures and practical work will be presented by the School of Household Economics. A series of lectures will be given in Administration and the theory of Occupational Therapy.

Textbook: Willard and Spackman, *Principles of Occupational Therapy.*

***Physiology 261 or 361** (3-3; 3-3)

The lecture course comprises the essentials of human physiology. The laboratory course provides experience in handling living tissues and in certain basic physiological techniques.

Textbooks: Guyton, *Functions of the Human Body;* Bell, Davidson and Scarborough, *Textbook of Physiology and Biochemistry.*

Prerequisites: Zoology 220 or Biology 130 or 230; and Anatomy 200.

***Psychiatry 300** (1-0; 1-0)

An orientation towards the understanding of personality, its development and function. A discussion of personality types in health and disease.

Textbook: Coleman, *Abnormal Psychology of Modern Life* (Scott, Foresman and Co.)

Sociology 202 (3-0; 3-0)

The sociological study of society, social institutions, group behaviour, personality formation and social change.

Hospital Internship 301 (12 weeks)

A period of three months will be spent in approved hospitals and institutions in the Province of Alberta. During this time the students will undertake practical experience in Occupational Therapy Departments.

Third Year

Applied Anatomy 401 (0-1; 0-1)

A practical course in the study and elevation of anatomical movement in relation to functional activities.

***Clinical Neuro-Physiology 400** (2-0; 2-0)

An introduction and appreciation of the neuro-physiology and gross pathology of some of the common disease conditions referred to the Physical Medicine Department for treatment. This lecture series will be supplemented by clinical patients and visual aids. Some of the disease conditions covered are: Hemiplegia, Parkinson's Disease, Multiple Sclerosis, Amyotrophic Lateral Sclerosis, Syringomyelia, Anterior Poliomyelitis, Neuritides, Peripheral Nerve Injuries, Herpes Zoster, Neurasthenia, Hysterical manifestations, Paraplegia and Quadriplegia.

***Clinical Therapeutics 400** (2-0; 2-0)

The medical application of physical principles and rehabilitation techniques for disabled people, demonstrated clinically with patients and assisted by Hospital and Clinic staff.

Occupational Therapy 400 (3-0; 4-0)

A presentation in tutorials and lectures of the purpose and function of the profession. The principles of teaching, work adjustment and evaluation, programming, management in the home for the disabled homemaker, and the principles of time and motion study will be emphasized. Textbook: Macdonald, *Occupational Therapy in Rehabilitation* (Bailliere, Tindall and Cox).

Hospital Internship 401 (0-9; 0-11)

Third year students will attend supervised clinics at the University Hospital and other approved institutions, and continue their practical training under the supervision of qualified Occupational Therapists.

Occupational Therapy 401 (0-8; 0-11)

Practical laboratory experience in Therapeutic Occupations for every type of patient. Recreational activities. Job-sampling techniques applied to pre-vocational evaluation.

Psychiatry 400 (4-0; 0-0)

A discussion of factors influencing personality function—factors both detrimental and beneficial, leading to a discussion of personality disorders, their diagnosis, classification and treatment, with special reference to the role of the Occupational Therapist. Case studies will be made.

***Speech Therapy 400** (2-0; 0-0)

A series of lectures which will include an introduction and orientation of Speech Therapy in the retraining of the disabled suffering from dysarthria, defective speech and aphasia.

PHYSICAL THERAPY PROGRAMME

First Year:

Subject	Course No.	Hours
*Anatomy	Anatomy 200	208
*Biology	Biology 130 or 230	156
*English	English 210	78
*Physical Education	Physical Education 226	52
Physical Therapy	Physical Therapy 200	104
*Psychology	Psychology 212	78
*Rehabilitation	Rehabilitation 200	78
	TOTAL	754

Second Year:

Subject	Course No.	Hours
*Applied Anatomy	Applied Anatomy 300	52
Electrotherapy	Electrotherapy 300	78
Hospital Internship	Hospital Internship 300	234
*Medicine and Surgery	Medicine and Surgery 300	52
*Physiology	Physiology 261/361	156
*Psychiatry	Psychiatry 300	26
Remedial Exercises	Remedial Exercises 300	182
	TOTAL	780
	Hospital Internship 300	480
	TOTAL	1260

Third Year:

Subject	Course No.	Hours
Applied Anatomy	Applied Anatomy 400	52
*Clinical Neuro-Physiology	Clinical Neuro-Physiology 400	52
*Clinical Therapeutics	Clinical Therapeutics 400	52
Electrotherapy	Electrotherapy 400	78
Hospital Internship	Hospital Internship 400	390
Remedial Exercises	Remedial Exercises 400	182
*Speech Therapy	Speech Therapy 400	26
	TOTAL	832

CALENDAR COURSE DETAILS—PHYSICAL THERAPY

First Year

***Anatomy 200** (3-5; 3-5)
See description under Occupational Therapy section.

***Biology 130** (3-3; 3-3)
See description under Occupational Therapy section.

***Biology 230** (3-3; 3-3)
See description under Occupational Therapy section.

***English 210** (3-0; 3-0)
See description under Occupational Therapy section.

***Physical Education 226** (0-2; 0-2)
See description under Occupational Therapy section.

Physical Therapy 200 (0-0; 2-6)
A series of lectures and laboratory periods will be given in the Theory of Movement, Body Mechanics, and early Re-education following injury or disease. A series of practical classes in the application of Massage techniques will be included.

***Psychology 212** (3-0; 3-0)
See description under Occupational Therapy section.

***Rehabilitation 200** (1-5; 0-0)
See description under Occupational Therapy section.

Second Year

***Applied Anatomy 300** (0-2; 0-2)
See description under Occupational Therapy section.

Electrotherapy 300 (1-2; 1-2)
An introduction to the basic physical principles in electricity as it applies in Physical Therapy. It will include practical laboratory participation in the application of simple procedures with direct, low frequency and high frequency currents.

Hospital Internship 300 (0-9; 0-9)
An introduction to the practical application of Physical Therapy techniques on patients suffering from various physical diseases, in approved institutions.

***Medicine and Surgery 300** (2-0; 2-0)
See description under Occupational Therapy section.

***Physiology 261 or 361** (3-3; 3-3)
See description under Occupational Therapy section.

***Psychiatry 300** (1-0; 1-0)
See description under Occupational Therapy section.

Remedial Exercises 300 (3-4; 3-4)
A continuation of Physical Therapy 200 with particular emphasis on the application of basic principles to treatment of common Arthritic, Orthopaedic and Neurological Conditions.

Hospital Internship 300 (12 weeks)
During the summer following completion of second year the students will undertake 12 weeks practical experience in an approved Physical Therapy department in the Province of Alberta.

Third Year

Applied Anatomy 400 (0-2; 0-2)
A review of basic anatomy with particular emphasis on its application to function of the body.

***Clinical Neuro-Physiology 400** (2-0; 2-0)
See description under Occupational Therapy section.

***Clinical Therapeutics 400** (2-0; 2-0)
See description under Occupational Therapy section.

Electrotherapy 400 (1-2; 1-2)
Lecture-demonstrations are given on basic electronics, including Ultrasound, Short Wave Microwave and Radiations. Practical classes will

include techniques of application of stimulating currents, and discussions of the use of Electrotherapy in medical and surgical conditions.

Hospital Internship 400 (0-15; 0-15)

This will be a continuation of practical experience in approved hospitals and Clinics in the city.

Remedial Exercises 400 (3-3; 3-5)

Lecture-demonstrations and practical classes are given on re-education of movement and Remedial Exercises in medical and surgical conditions from acute illness to full rehabilitation. Special emphasis will be given to advanced Neurology, Resporatory Conditions, Obstetrics and Amputations.

***Speech Therapy 400** (2-0; 0-0)

See description under Occupational Therapy section.

XXI

The Faculty of Science

INFORMATION, REGULATIONS, COURSES

OFFICERS OF THE FACULTY OF SCIENCE

Dean—M. Wyman
Associate Dean—K. B. Newbound
Assistant Dean—R. C. Jacka

Matriculation—Alberta Students

Students from the high schools of Alberta seeking admission to the Faculty of Science must present a high school diploma with "B" or higher standing and an average of at least 60.0% in the following required courses:

1. English 30.
2. Social Studies 30.
*3. Mathematics 30.
†4. French 30 or German 30 or Latin 30.
**5. and 6. *Two* of: Chemistry 30, Physics 30, Biology 30, (or Biology 32 up to and including 1965).

---

*Mathematics 31 (Trigonometry) with B standing or better will also be required for admission to the honors programs in Mathematics, Physics and Physics and Geology. It is strongly recommended for students intending to concentrate on studies in the Physical Sciences (Chemistry, Geology, Mathematics and Physics) in the general program.

**Pre-dental students must present Physics 30 and Chemistry 30.

†Ukrainian 30 will also be accepted as soon as a Departmental examination is given in this subject.

Students whose matriculation credits were secured in 1954 or earlier are given full consideration; they are advised to forward to the Registrar complete transcripts of their high school records.

The requirement for a high school diploma may be waived for students of mature age.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this right may be exercised in cases where applicants have written an inordinate number of examinations in order to obtain nominal entrance requirements.

Matriculation—Students from Outside Alberta

Students whose matriculation credits are secured outside Alberta are required to meet standards equivalent to those for Alberta students. They are advised to forward to the Registrar complete transcripts of their high school, or equivalent, records well in advance of the date for registration. A fee of five dollars is charged for evaluating documents originating in Canada and ten dollars if issued in other countries. The University reserves the right to prescribe additional examinations in cases where doubt exists concerning matriculation.

Matriculation Deficiences

Except as provided below, no student will be admitted to the Faculty of Science with a deficiency in matriculation.

The University offers courses (usually numbered 100) at the Grade XII level for students who are beginning their study of a particular subject. In certain circumstances, and only with the permission of the Dean, a student may take one such course to remove a matriculation deficiency, in which case it will not count towards a degree.

Promotion Regulations

Since students' fees cover less than one-quarter of the cost to the Province of their University education, the administration is in duty bound to ensure that only those students remain in the University who make effective use of its facilities. For this reason students' records are carefully reviewed from time to time, and those whose standing is unsatisfactory may be obliged to withdraw from the University.

Detailed regulations regarding promotion from one year to another are found in the general regulations for the Honors Programs and the General Program.

Faculty Regulations

Academic regulations governing students in the Faculty of Science are contained in this section and in the general section of the Calendar. However, regulations applicable to particular programs appear in the sections of the Calendar in which these programs are published. In addition, certain courses are subject to individual requirements. Students are advised to read and consider these regulations with great care, and in case of doubt as to the precise meaning of any statement or regulation, to consult the office of the Dean or the Department concerned.

PROGRAMS OF STUDY

The Faculty of Science offers honors programs and general programs leading to the degrees of Bachelor of Science (B.Sc.), and Bachelor of Science in Household Economics. The Faculty includes the School of Household Economics.

Honors Programs

The honors programs lead to the B.Sc. degree, with honors in a particular subject or subjects, in four years. They are designed to provide specialization in the chosen subject or subjects together with a longer training than in the general program, as well as the higher standard implied by the term "honors". An honors program may be interrupted only by special permission of the Council of the Faculty.

Most departments provide a special first year for students who wish to take honors. Permission to take first year honors is granted to students with high matriculation standing and with the approval of the department concerned. A request for this privilege should be made on the Application for Admission or through the head of the department not later than the time of registration. A student who, in his first year, fails to attain the standard necessary for continuance in honors, must transfer to the general program and subsequently must complete all its requirements. The special first year honors programs are so designed that a student can proceed to a degree in the general program without penalty.

A student need not commit himself to honors in his first year, and may register in an appropriate selection of courses as required by the regulation of the general program. If he obtains a sufficiently high standard in his first year and is recommended by the department concerned, he may enter honors in his second year. A student desiring to do so must apply to the Dean, through the head of the department concerned, preferably during his first year and in any case not later

than the time of registration for the second year. Consideration will also be given to applications for transfer to honors submitted by students who have completed the second, or even the third, year of the General Program.

Promotion from first year to second year, as well as from second to third and from third to fourth, is by recommendation of the department concerned, for which an average of at least 65% is required. A student who is not recommended to continue in honors at the end of his second year will be transferred to the general program, and must select his courses accordingly.

A student who is not recommended to continue in honors at the end of his third year, or who fails to complete the requirements for a degree with honors in his fourth year, may be granted the general degree forthwith, provided that the courses he has taken and the standing attained are satisfactory. Otherwise he may be required to take one or more additional courses in a subsequent summer or winter session. A student who, for any reason, is unable to return to university for the fourth year may apply for a general degree under the same conditions.

In all years a student's program must be approved by his department and by the Dean, and is subject to the following general provisions:

1. A student is not permitted to confine his studies to one discipline; during his first three years he must take at least three courses not closely related to his subject of specialization. For example, a student specializing in Natural Science, must take at least three Arts courses.
2. In the third and fourth years considerable latitude is permitted in order to meet the needs of individual students. A student may choose to concentrate closely on one subject or to widen his field of study. In the latter case he will not be required to take, over the four years, more than ten courses in the subject of concentration.
3. German 210 or Russian 210 is permitted for credit as an approved option in any year.
4. The term "option", where it appears in the programs, is to be construed as a course freely chosen by the student provided he has necessary prerequisites. An "approved option" is to be construed as an option approved by the department directing the program of the student concerned.

Degrees with honors are awarded in two classes, first class honors and honors. For first class honors an average of 80% is required; for honors, 65%. In awarding honors the entire university record of the student may be considered.

The prescriptions for honors programs are listed with the offerings of individual departments.

THE GENERAL PROGRAM

Attention is directed to the regulation in Part I of this Calendar which makes every student responsible for the completeness and accuracy of his registration. This regulation will be strictly enforced.

No candidate for a Bachelor's degree in the Faculty of Science will be recommended to the General Faculty Council for the award of the degree until three regular academic sessions, September to April, have elapsed after the date of registration in the first year.

Except by special permission of the Council of the Faculty, no student under its jurisdiction may offer for credit towards a degree in any period of twelve months,

September 1 to August 31, more than five courses, either in the regular academic session or in both the regular and summer sessions. No student may take more than two courses in any one summer session, or in the evening credit program in any academic session, or more than three courses in any combination of these in a period of twelve months, September 1 to August 31.

Students proceeding to a Bachelor's degree in the Faculty of Science will be required to complete a program of normal weight in at least one regular academic session, September to April. Exceptions may be made to this rule in the cases of teachers who have had at least two years' experience subsequent to receiving permanent teaching certificates. Such students may meet the requirements for the degree of Bachelor of Science by attendance in the summer session and the evening credit program. They are warned that the University cannot undertake to offer in summer sessions and in evenings all the courses required for the Bachelor of Science degree.

To be granted the B.Sc. degree, a student must present passing marks or better in a minimum of fifteen full courses, and an average of at least 60 per cent in all courses credited toward the degree after the first year.

A student will not be allowed to write more than five supplemental examinations for the purpose of obtaining passing marks or of raising his average to the required 60 per cent. A student may not write more than two supplemental examinations in any year.

A student who is repeating a year will be granted no supplemental privileges in the courses taken that year, and must pass all courses with a 60 per cent average to be allowed to continue in the Faculty of Science. The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in this Faculty, unless by special permission of the Dean.

Requirements for the B.Sc. in the General Program

First Year

English 200 or 210; an Arts course; a Science course; two options.

Second Year

An Arts course; a Science course; three options.

Third Year

An Arts course; a Science course; three options.

Notes: 1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.

2. There may not be more than seven junior courses in the program, except by special permission of the Dean.

3. A student registering for the B.Sc. degree must choose his principal subject of concentration in the physical or biological sciences. To be awarded the B.Sc., the student must pass at least eight science courses. Not more than eleven science courses may be credited towards the degree.

4. Students should study the Advice to General Program Students, which appears under the departmental headings on subsequent pages of this Calendar, and should consult members of the departments offering the courses they choose.

Requirements for B.Sc. after B.Ed.

Students who have qualified for the degree of B.Ed. may proceed to the degree of B.Sc. If they have met the matriculation requirements of the Faculty of Science and can present credit in thirteen Arts and Science courses, they will be required to complete six additional senior Arts or Science courses, as prescribed by the Faculty of Science, and to attain an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Science will be required to remove any deficiencies; students with fewer than thirteen Arts or Science courses will be required to take additional courses.

Students who propose to secure the B.Sc. degree in this manner are advised to consult the Dean before registering in the Faculty of Science.

Requirements for B.Sc. after B.A.

Students who have qualified for the degree of B.A. may proceed to the degree of B.Sc. by completing a 9-course program as prescribed by the Faculty of Science and attaining an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Science will be required to remove any deficiency.

Pre-Professional Requirements—Faculty of Medicine

Admission to the Faculty of Medicine is contingent upon the successful completion of two years of University study and the presentation of full university courses in organic chemistry, inorganic chemistry, physics and zoology. Students who register in the Faculty of Science in order to meet these requirements should include in their programs Chemistry 230 and 350, Physics 100, 200 or 240 and Biology 230 or equivalent. If Physics 240 is taken, it should be followed by Physics 340.

Pre-Professional Requirements—Faculty of Dentistry

The Faculty of Science offers the following pre-dental year, which meets the basic minimum pre-professional requirements for the course leading to the degree of D.D.S.:

Chemistry 230
Chemistry 250
Zoology 221
One Humanities option (English 200 or 210 recommended)
One Social Science option (Psychology 202 recommended)
Physical Education

Additional requirements are listed in the calendar of the Faculty of Dentistry.

Classification of Courses

Courses offered in the Faculties of Arts and Science are classified as follows:

Humanities

Art	Italian
Classics 350, 351, and 354	Latin
Comparative Literature	Linguistics
Drama	Music
English	Old and New Testament Literature
French	Polish
German	Russian
Greek	Scandinavian
Hebrew (St. Stephen's College)	Spanish
Household Economics 350	Ukrainian

Social Sciences

Anthropology
Classics 352, 353, 355, 356, 357 and 395
Christian Apologetics 366 (St. Joseph's College)
Economics
Education
Geography—Courses as listed in the Calendar of the Faculty of Arts.
History
Philosophy
Political Science
Psychology—Courses as listed in the Calendar of the Faculty of Arts.
Sociology

Natural Sciences

Astronomy
Bacteriology
Biochemistry
Biology
Botany
Chemistry
Computing Science
Entomology
Genetics
Geography—Courses as listed in the Calendar of the Faculty of Science
Geology
Household Economics 210
Mathematics
Microbiology
Physical Science
Physics
Physiology
Plant Biochemistry and Physiology
Psychology—Courses as listed in the Calendar of the Faculty of Science
Statistics
Zoology

Courses numbered 100 to 299 inclusive, described as junior, are open to first-year students and, in some circumstances, are also available as options in senior years. Courses numbered 300 to 499, described as senior, are primarily for students beyond the first year at University. Those numbered 500 or higher are open to honors and graduate students. For further information, particularly in the matter of prerequisites, students are advised to consult the section of the calendar containing detailed descriptions of courses.

A student shall restrict his first year registration to junior courses in five different subjects. Senior courses may be taken in the first year only with the consent of the department concerned and the approval of the Dean.

GRADUATE STUDIES

Students wishing to pursue work towards the Master's or Doctor's degree should consult the calendar of the Faculty of Graduate Studies.

DETAILS OF COURSES

Notes: 1. Instructors are listed by departments. The rank in each case is that held in May 1964.

2. The hours of instruction for both terms of the winter session are shown at the top of each course description. The letter "L" attached to a figure signifies lecture-laboratory-hours, and the letter "s" seminar-hours. The symbol 3/2 means three hours in alternate weeks. Unless otherwise specified, the first figure in each term indicates lecture-hours and the second laboratory-hours.

The University reserves the right to modify or withdraw for the session any of the courses here outlined.

ASTRONOMY

Instruction offered by members of the Departments of Mathematics and Physics.

253. Astronomy (3-0; 3-0)

History of early astronomy, study of the earth, astronomical coordinates, time. The solar system, the stars, structure of the universe, origin of the solar system. Practical work; study of the constellations; discussion of articles in current journals.

Prerequisite: Mathematics 30. Some knowledge of Trigonometry is required and students are advised also to have credit in Math. 31.

410. Astrophysics (3-0; 3-0)

Stellar spectra and their interpretation, deduction of the characteristics and constitution of stars, cosmological theories, spectroscopy of the planets and theories of the solar system, terrestrial magnetism, structure of the earth, radio-astronomy and other modern advances.

Prerequisites: A University course in Physics, Mathematics 200 or 201.

BACTERIOLOGY

See under Microbiology

BIOCHEMISTRY

Instruction offered by members of the Department of Biochemistry in the Faculty of Medicine.

Honors in Biochemistry

In the Honors program in Biochemistry opportunity will be given, in the choice of options, for concentration in various areas of Biochemistry.

First Year

Chemistry 230, Chemistry 250, Mathematics 201, Biology 130 or 230, English 200 or 210, Physical Education.

Second Year

Biochemistry 300, Chemistry 372, Physics 240, Mathematics 304, an Arts option (German 210 or Russian 210 recommended).

Third Year

Two senior half courses in Biochemistry, Chemistry 312, Physiology 361 or Botany 320, Physics 340, an Arts option.

Fourth Year

Biochemistry 501, two senior half courses in Biochemistry, Chemistry 450 or 550, two approved options.

Students wishing to major in Plant Biochemistry must take Botany 320 in the third year, and elect Plant Biochemistry in the third and/or fourth years. Recommended options for fourth year include: Chemistry 551, 555, 571, 575, 579, 585; Biometrics 454, Genetics 351, Microbiology 360.

Students are advised to have a reading knowledge of French, German or Russian. Attendance at the departmental seminars is required in fourth year. Students may be required to take a comprehensive oral examination at the end of the fourth year.

300. General Course (3-3; 3-3)

Structure and chemistry of the cell; acidimetry and alkalimetry; chemistry of carbohydrates, lipids, proteins and nucleic acids; enzymes; bioenergetics; digestion, absorption and intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids; mineral metabolism; vitamins; blood chemistry; chemistry of respiration.

Prerequisites: Chemistry 230, Chemistry 250.

400. Clinical Biochemistry (2-3; 2-3)

Principles and instrumentation; quality control; clinical chemistry of blood and urine; gastric, kidney and liver function tests; disturbances of acid-base, electrolyte, and mineral metabolism; inborn errors of metabolism. The emphasis throughout the course is upon critical appraisal of biochemical methods as applied to the study of disease.

Prerequisite: Biochemistry 300.

Honor and Graduate Courses—

501. Advanced Laboratory (0-3; 0-3)

A laboratory course to accompany the graduate lecture courses offered to fourth year Honors and to graduate students. The emphasis will be on standard methods and techniques as applied to biochemical research. The actual course content may depend upon the lecture courses selected and the interests of the students.

Prerequisite: Biochemistry 300 or 350.

Available to fourth year Honors Biochemistry students only.

511. Enzymology

The properties of enzymes and cofactors; the chemistry, mechanisms and kinetics of selected enzymic reactions; the principles of multi-enzyme systems.

Prerequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432, Chemistry 372.

521. Nucleic Acids (0-0; 3-0)

A consideration of the nucleic acids from the points of view of chemistry, structure and function. Specific topics will include the following: classes of nucleic acids and their distribution in cells; basic composition of nucleic acids and the structural chemistry of their constituents; isolation and physicochemical characterization of the nucleic acids; pathways of bio-synthesis of the nucleic acids; biological functions of the nucleic acids with emphasis on the role of the ribonucleic acids in protein biosynthesis.

Prerequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432. It is recommended that Biochemistry 531 (Chemistry of Proteins) be taken prior to or concurrently with this course.

531. Chemistry of Proteins (0-0; 3-0)or(3-0; 0-0)

A lecture course on topics in protein chemistry, including the following: isola-

tion and solubility; electrochemical properties; size, shape and hydration; internal structure; relation of structure to function as exemplified by special protein systems.
Prerequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432, Chemistry 372.

561. Chemistry of the Erythrocyte (3-0; 0-0) or (0-0; 3-0)

A lecture course on recent advances in the chemistry of mammalian erythrocytes, to include: structure and composition; the hemoglobins; metabolism and biochemical lesions; permeability and cation transport; the life span; blood storage.
Prerequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432.

571. Recent Advances (3-0; 0-0) or (0-0; 3-0)

A lecture course on topics of current interest in Biochemistry, with reading of original literature.
Prerequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432.

N.B.—Not all graduate courses are offered every year.

Students wishing to proceed to the degree of M.A., M.Sc., or Ph.D. in Biochemistry should consult the Head of the Department with regard to requirements and research facilities.

BIOLOGY

Instruction offered by members of the Departments of Botany, Entomology, Genetics and Zoology.

Advice to General Program Students

Students who choose biology as a subject of concentration are advised to consult the members of the Permanent Committee on the Biological Sciences most appropriate to their interests; this committee is represented in the Departments of Botany, Entomology, Genetics and Zoology.

130. Introductory Biology (3-3; 3-3)

An introduction to Biology, with emphasis on principles. Not open to students with credit in Biology 30.

230. Plant Form and Function (3-3; 3-3)

Comparative morphology and physiology of plants at an intermediate level. 1st Term or 2nd Term.

Comparative Zoology

Animal morphology, physiology and development at an intermediate level. 2nd Term or 1st Term.
Prerequisite: Biology 30 or 130.

341. General Biology (3-2; 3-0)

Introduction to the plant and animal kingdoms; organization and develop-

ment of plants and animals; adaptation to environment; variations, heredity and selection; evolution and origin of species; history of biology; biology and human welfare.

NOTE: This course is open to B.A. and B.Ed. students only. It is not open to first year students and may not be taken for credit by students who already have taken Botany 201, Zoology 220, or Biology 30.

451. History and Philosophy of Biology (3-0; 3-0)
An account of selected periods of biological discovery in relation to historical and cultural developments; an examination of the important ideas which have arisen from, or which have influenced biology. Intended especially for honors students in biological subjects but open to other students with necessary prerequisites.
Prerequisite, Biology 230 or Biology 341.

BOTANY

Professors—H. J. Brodie (Head), R. G. H. Cormack, J. H. Whyte
Associate Professor—Lorene L. Kennedy
Assistant Professors—E. A. Cossins, J. G. Packer, G. H. LaRoi

Honors in Botany

Students intending to enter the Honors program in Botany should consult the Department for advice about the details. The Honors program provides a comprehensive training in Botany and is the most desirable route for students intending to proceed to higher degrees and a research or academic career.

A minimum of eight courses in Botany must be taken in the Honors program. Certain ancillary subjects are required and certain others are recommended as options. Students are normally required to take courses in the following subject areas: (1) Introductory Botany; (2) Plant Anatomy; (3) Plant Physiology; (4) Plant Taxonomy; (5) Plant Ecology. Certain of the above subjects are covered by more than one of the senior courses. Some half-year courses may be combined to constitute a full-year course in the areas mentioned (3, 4 and 5 above).

Attendance at the weekly one-hour seminar, Botany 420, is required in the third and fourth years.

Students are required to make themselves acquainted with Canadian plants by collecting and reading during the summer months.

First Year

English 200 or 210; Chemistry 130 or 230; Geology 201; an approved option*; Biology 130 or Biology 230**; Physical Education.

Second Year

Two senior courses in Botany; Chemistry 350; a Science option; an Arts option.

---

*Students without Physics of matriculation should take Physics 100.

**Students lacking Biology 30 are required to take Biology 130; students who have taken Biology 30 may preceed to more advanced courses with the consent of the Department.

Third and Fourth Years

Five senior courses in Botany, one of which must be Botany 400; four approved options; one open option.

Advice to General Program Students

Students intending to pursue botany as far as the General Program Curriculum allows are advised to include in their program, *five* full-year courses dealing with the following subject areas: (1) Introductory Botany; (2) Plant Anatomy; (3) Plant Physiology; (4) Plant Taxonomy; (5) Plant Ecology.

Certain of the above subjects are covered by more than one of the senior courses. Some half-year courses may be combined to constitute a full-year course in items 3, 4, 5 above.

It should be noted that not every half-year course is offered in any particular year.

Junior Course—

See Biology 130 and Biology 230.

Senior Courses—

300. Flowering Plants (3-3; 3-3)

The origin and evolution of flowering plants; their morphology and classification; species concepts; plants in relation to their environment; principles of nomenclature.

Prerequisite: Biology 230 or consent of department.

301. The Plant Groups (0-0; 3-3)

Systematic study of the divisions of the plant kingdom with emphasis on reproduction and phylogeny.

Prerequisite: Biology 230 or consent of department.

302. The Flora of Alberta (0-0; 3-3) or (3-3; 0-0)

Identification of the principal components of the plants of Canada with emphasis on the flora of Alberta.

Prerequisite: Biology 230 or consent of department.

310. Plant Anatomy and Histology (3-3; 3-3)

A course in the structure and development of organs and tissues of the higher plants. Emphasis is placed on the experimental approach to anatomical studies and on the environmental and physiological control of development and morphology.

Prerequisite: Biology 230 or consent of department.

320. Plant Physiology (3-3; 3-3)

Physical phenomena in living cells; water relationships of plants. Respiration, photosynthesis and growth.

Prequisites or corequisites: Biology 230; Chemistry 230; Chemistry 250 or 350, or consent of department.

321. Plant Geography (0-0; 3-0)

A study of the earth's main vegetational types and the significance of their present day distribution. Normally to be taken in sequence with Zoology

321. Open to students in the third year of Botany and Zoology programs and to students in the Geography programs.
Prerequisites: Biology 230 and Geography 201 or consent of department.

331. Phycology (3-3; 0-0)

The structure, physiology and classification of the algae with special reference to Alberta plants. Consideration is given to the evolution of these plants and their role in nature.

Prerequisite: Biology 230 or consent of department.

332. Lichens and Bryophytes (0-0; 3-3) or (3-3; 0-0)

Approximately half the course deals with structure, physiology and classification of the lichens, and half with structure classification and ecology of the bryophytes.

Prerequisite: Biology 230 or consent of department.

341. Mycology (3-3; 0-0)

A systematic survey of the fungi with detailed study of representatives of major groups. Emphasis is given to classification, life cycles and distribution.
Prerequisite: Biology 230 or consent of department.

342. Physiology of Fungi (0-0; 3-3) or (3-3; 0-0)

Factors affecting growth and reproduction of fungi; beneficial and harmful activities of fungi.
Prerequisite: Biology 230 *and* Botany 341 or consent of department.

351. Seedless Vascular Plants (3-3; 0-0) or (0-0; 3-3)

The structure, reproduction and classification of the seedless vascular plants with emphasis on their evolution and their place in the history of terrestrial vegetation.
Prerequisite: Biology 230
Prerequisite or corequisite: Botany 310.

352. The Gymnosperms (0-0; 3-3) or (3-3; 0-0)

The structure and evolution of the Gymnospermae; taxonomy and geographic distribution of living gymnosperms.
Prerequisite: Biology 230.
Prerequisite or corequisite: Botany 310.

360. Palaeobotany (3-3; 3-3)

Systematic study of fossil plants.
Prerequisite: Botany 310; Geology 201.

400. Special Problems (6L; 6L)

Assigned reading or laboratory projects.
Prerequisites: Biology 230 and one senior course in Botany.

420. Seminar in Botany (1s-0; 1s-0)

Participation required of all Senior and Graduate Students.

422. Plant Ecology (3-3; 0-0)

Plant-environment relationships at the organism, population and community levels; a study of ecological principles. Laboratories will involve field trips.
Prerequisites or corequisites: Botany 300 and 320; or consent of department.

463. Botanical Techniques (0-0; 0-6L)

A laboratory course covering basic techniques of special value to botanists; isolation and culture of microscopic plants; elements of photography; preparation of herbarium specimens, etc.
Prerequisites: Biology 230 *and* one senior course in Botany.

Honor and Graduate Courses—

504. Advanced Mycology (6L; 6L)

Classification, morphology and physiology of the fungi.
Prerequisites: Botany 341, Botany 342.

506. Advanced Taxonomy (6L; 6L)

Speciation and species problems in the flowering plants; cytotaxonomy and the use of experimental methods in taxonomy.
Prerequisite: Botany 300 or consent of department.

507. Advanced Plant Anatomy and Histology (6L; 6L)

Modern methods of preparing plant material for microscopic examination, with practice in fixing, embedding, cutting and staining.
Prerequisite: Botany 310 or consent of department.

508. Vegetation Analysis (0-0; 3-2)

Methods of surveying and sampling the structural and compositional attributes of plant communities. Lectures and laboratory-field demonstrations.
Prerequisites: Botany 422, Statistics 255 or Biometrics 455, or equivalents; or consent of department.

509. Pollen and Spore Morphology (0-0; 3-3) or (3-3; 0-0)

A laboratory-conference course dealing with pollen and spore morphology; techniques of study; applications of information provided by study of these structures.
Prerequisite: Consent of department.

510. Environment Analysis (3-3; 0-0)

Methods of obtaining and treating environmental data for ecological studies of plant-environment relationships. Emphasis on instrumentation and microenvironment. Lectures and laboratory-field demonstrations.
Prerequisites: Botany 422 or Zoology 462, Statistics 255 or Biometrics 455, or equivalents; or consent of department.

511. Advanced Plant Ecology (0-0; 3-0)

Development of concepts relating to systematic and geographic treatments of plant communities. Studies of Anglo-American and Eurasian schools of ecological thought. Seminar discussions of these and other topics.
Prerequisite: Botany 422 or equivalent; or consent of department.

521. Plant Geography II (0-0; 3-0)
A study of plant distribution patterns and the theories advanced to explain them.
Prerequisite: Botany 321.
Prerequisite or corequisite: Botany 300.

531. Advanced Phycology (6L; 6L)
Investigation of special problems in the study of Algae involving laboratory projects and reading of current literature.
Prerequisite: Botany 331 or consent of department.

551. Advanced Plant Biochemistry (3-0; 0-0) or (0-0; 3-0)
This course is identical to Plant Physiology and Biochemistry 551 and to Plant Science 551.
Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and of methods of investigation in these fields.
Prerequisites: Biochemistry 300, or Plant Physiology and Biochemistry 431 and 432 or consent of departments.

CHEMISTRY

Professors—H.E. Gunning, (Head), R. K. Brown, W. E. Harris, R. U. Lemieux, R. B. Sandin

Associate Professors—W. F. Allen, W. A. Ayer, C. E. Bigelow, F. W. Birss, R. J. Crawford, D. Darwish, S. G. Davis (Secretary), H. B. Dunford, G. R. Freeman, W. A. G. Graham, P. Kebarle, R. N. O'Brien

Assistant Professors—R. C. Cavell, S. Fraga, A. H. Kalantar, K. R. Kopecky, J. W. Lown, J. S. Martin, S. G. McGeachin, G. J. D. Peddle, O. Strausz

Honors in Chemistry

First Year
Chemistry 230, Chemistry 250, Physics 240, Mathematics 201, English 200 or 210, Physical Education.

Second Year
Chemistry 312, Chemistry 372, Physics 340, Mathematics 304, An option (1).

Third Year
Chemistry 511 and 583, Chemistry 550, Chemistry 572, Mathematics 404, an option.

Fourth Year
Chemistry 530, Chemistry 551 and 555, Chemistry 501 and a Chemistry option (2), two options.

As well as the prescribed courses, the program must include:
(i) One non-Chemistry Science course;
(ii) One course in scientific German or Russian (unless advanced credit given);
(iii) One Arts course (not a beginning or scientific language);
(iv) One non-Chemistry option.

In addition to the regular course examinations, candidates for honors may be given one or more oral or written examinations in the field of chemistry at the end of the fourth year.

Attendance at the Departmental Research Seminar, Chemistry 602, which meets once a week is required in the fourth year.

NOTES: (1) Any arts or non-chemistry science course, except a beginning or scientific language course. If, however, Chemistry 250 was not taken in the first year, this must be Chemistry 350.

(2) One of Chemistry 553, 559, 561, 589 or 593.

(3) All options shall be selected in consultation with the Department.

(4) Special programs will be set up, following the above as closely as possible, for students transferring from other programs.

Advice to General Program Students

Students choosing chemistry as a subject of concentration should recognize the advisability of including mathematics and physics as ancillary subjects in their programs. The following sequences are recommended:

Three course sequence: Chemistry 230, 350 and one of 312 or 370.

Four course sequence: Chemistry 230, 350, 312 and 370.

Five course sequence: Chemistry 230, 350, 312, 370 and one of 430 or 450.

Students seeking pre-professional and vocational training in chemistry should consult the department.

130. Introductory General Chemistry (3-3; 3-3)

Lectures: An elementary introduction to Chemistry illustrated by the chemistry of metals, non-metals and of the carbon compounds.
Laboratory: Experiments related to the lecture material.

230. Inorganic Chemistry (3-1S-3; 3-1S-3)

Lectures: The fundamental concepts of Chemistry as applied to the elements and their compounds.
Laboratory: The preparation of some compounds; quantitative chemistry, and semi-micro qualitative analysis.
Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

250.* Organic Chemistry (3-3; 3-3)

Lectures: An introduction to a study of the compounds of carbon.
Laboratory: The preparation of some organic compounds.
Textbook: Fieser and Fieser, *Organic Chemistry;* or Noller, *Textbook of Organic Chemistry.*
Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

312. Quantitative Analysis (3-6; 3-6)

Lectures: Principles and methods of quantitative analysis.
Laboratory: Gravimetric, volumetric, colorimetric and electrometric methods of analysis.
Prerequisites: Chemistry 230 or 232.

---

*Students with credit in Chemistry 230 normally will proceed to Chemistry 350 not 250.

350. Organic Chemistry (3-3; 3-3)
Lectures: An introduction to a study of the compounds of carbon.
Laboratory: The preparation of some organic compounds.
Textbook: Boyd and Morrison, *Organic Chemistry.*
Prerequisites: Chemistry 130 or 230 or 232.

370. Elementary Physical Chemistry (3-3; 3-3)
Lectures: Fundamental concepts of matter in relation to energy; thermochemistry; properties of gases, liquids and solids; solutions; equilibrium; phase rule; electrochemistry; colloids; kinetics of reaction.
Laboratory: Physico-chemical measurements.
Textbook: Daniels and Alberty, *Physical Chemistry.*
Prerequisites: Chemistry 230 or 232; Physics 200 or 240; Mathematics 200 or 201.

372. Elementary Physical Chemistry (3-1S-3; 3-1S-3)
Lectures: Fundamental concepts of matter in relation to energy; thermochemistry, properties of gases, liquids and solids; solutions; equilibrium; phase rule, electrolytes, electromotive force, surface chemistry; kinetics of reaction.
Laboratory: Physico-chemical measurements.
Prerequisites: Chemistry 230 or 232; Physics 200 or 240.
Prerequisite or corequisite: Mathematics 304.
For honors students only, except by consent of department.

430. Inorganic Chemistry (3-3; 3-3)
Underlying principles of the subject followed by a study of the periodic table.
Laboratory: Preparation and study of some less common compounds.
Prerequisite: Chemistry 230.
Prerequisites or corequisites: Chemistry 370 or 372 and 312.

450. Organic Chemistry (3-3; 3-3)
Lectures: Continuation of the study of the aromatic and aliphatic compounds. General considerations and mechanisms involved in their reactions.
Textbook: Cram and Hammond, *Organic Chemistry.*
Laboratory: Preparation of some organic compounds.
Prerequisites: Chemistry 230 or 232 and 250 or 350.
Prerequisites or corequisites: Chemistry 370 or 372 and 312.

501. Chemical Research
Students in their fourth year of honors will pursue a half course in investigational work under the direction of a member of the department. The equivalent of at least eight hours per week of the second term must be spent on this course.

503. Special Topics in Chemistry (1964) (3-0; 0-0)
This will be given by visiting professors.

511. Instrumental Methods of Analysis (3-6; 0-0)
Lectures: Theory and practice of instrumental methods of analysis.
Textbook: Willard, Merritt and Dean, *Instrumental Methods of Analysis.*
Prerequisite: Chemistry 312.
Prerequisite or corequisite: Chemistry 370 or 372.

530. Inorganic Chemistry (3-3; 3-3)

Lectures: Bonding, structure and chemical properties of compounds, most of which do not contain carbon.

Text: Cotton and Wilkinson, *Advanced Inorganic Chemistry.*

Laboratory: Preparation and examination of inorganic compounds, illustrating useful experimental techniques.

Prerequisite or corequistie: Chemistry 583.

550. Organic Chemistry (3-6; 3-6)

Lectures: A continuation of Chemistry 250 or 350.

Laboratory; Preparation of some compounds; the use of certain equipment such as that used for low-pressure hydrogenation, etc., special techniques such as chromatographic adsorption, etc.

Textbook: Fuson, *Organic Chemistry;* Cram and Hammond, *Organic Chemistry*
Prerequisites: Chemistry 250, 350, 312, and 370 or 372.

551. Qualitative Organic Analysis (2-6; 0-0)or(0-0; 2-6)

A study of the characteristic reactions of the various groups of organic compounds and the classification and identification of a number of unknowns from these reactions.
Textbooks: Shriner, Fuson and Curtin, *The Systematic Identification of Organic Compounds* (4th edition); Cheronis and Entrikin, *Semimicro Qualitative Organic Analysis* (2nd edition).
Prerequisite: Chemistry 550.

553. Chemistry of Carbohydrates (0-0; 3-0)

Lectures: A study of monosaccharides, oligosaccharides and polysaccharides, their properties and derivatives.
Prerequisite or corequisite: Chemistry 450 or 550.
References: Pigman, *The Carbohydrates; Advances in Carbohydrate Chemistry.*

555. Theoretical Organic Chemistry (3-0; 0-0)

The applications of current theories to various classifications of reactions are considered. Hammett's correlation of reaction rates, stereochemistry, kinetics, resonance, and factors important to the course of a reaction are discussed.
Textbook: Hines, *Physical Organic Chemistry,* 2nd edition.
Prerequisite: Chemistry 550.

559. Natural Products (3-0; 0-0)

The chemistry of some alkaloids, terpenoids, steroids, and microbial metabolic products; structural determination, possible modes of biogenesis and synthesis of some of these compounds will be discussed.
Prerequisite: Chemistry 550.

561. Advanced Organic Synthesis (0-0; 3-0)

Modern synthetic methods and techniques in the field of organic chemistry with emphasis on recent literature.
Prerequisite: Chemistry 450 or 550.

571. Colloid Chemistry and Surface Chemistry (3-3; 0-0)
A course dealing with the kinetic and electrical properties of colloidal systems, adsorption at interfaces, thermodynamics of surfaces, theories of adsorption, catalysis.
Textbook: Jirgensons and Straumanis, *Colloid Chemistry.*
Prerequisites: Chemistry 350, 372; Mathematics 304.

572. Advanced Physical Chemistry (3-6; 3-6)
Lectures: Atomic structure, particles and waves, chemical bonds, molecular structure and spectroscopy, solid and liquid states, chemical kinetics, electrochemistry.
Laboratory: Physical Chemistry measurements.
Texts: Moore, *Physical Chemistry;* Shoemaker and Garland, *Experiments in Physical Chemistry.*
Prerequisite: Chemistry 370 or 372; mathematics 304.

573. Electrochemistry (0-0; 3-0)
A research approach to problems of interest in the field emphasizing the recent literature.
Prerequisites: Chemistry 312, 372.

577. The Phase Rule and Heterogeneous Equilibria (0-0; 3-0)
The fundamental relations between solid, liquid, and gas phases of single and multicomponent systems as revealed by Gibb phase rule. Applications will include the iron-carbon systems of steel manufacturers, and the lime-silica-alumina systems of interest in Portland cement manufacture and to geologists.
Prerequisite: Chemistry 372.

583. Quantum Chemistry (0-0; 3-0)
An elementary course in quantum mechanics with applications to chemical problems.
Textbook: W. Kauzman, *Quantum Chemistry*
Prerequisite: Chemistry 370 or 372.

587. Special Topics in Free Radical Chemistry (0-0; 3-0)

589. Statistical Mechanics (0-0; 3-0)
An introduction to statistical mechanics. Applications to problems of chemical interest will be stressed.
References: Fowler and Gugenheim, *Statistical Thermodynamics;* Davidson, *Statistical Mechanics;* Rushbrooke, *Statistical Mechanics.*
Prerequisite: Chemistry 583 or consent of department.

591. Radiation Chemistry (0-0; 3-0)
Brief discussion of radiation sources: interaction of radiation with matter; chemical effects of radiation.
Prerequisite: Chemistry 370 or 372.

593. Spectroscopy and Molecular Structure (0-0; 3-0)
A study of the spectral characteristics of matter. This will include the application of ultra-violet, visible, infrared, microwave, Raman, and atomic spectroscopy to problems of molecular structure.
Prerequisites: Chemistry 450 or 550 and Chemistry 583.
Textbook: Barrow, *Introduction to Molecular Spectroscopy.*

595. Photochemistry (3-0;-0-0)
The fundamentals and significant recent developments in photolytic and photosensitized reactions, including primary process studies.

597. Macromolecular Chemistry (3-0; 0-0)
The preparation, characterization and physical properties of synthetic organic high polymers and polyelectrolytes. Some discussion of inorganic polymers, nucleic acids, and proteins will be included.
Prerequisite: Chemistry 572 or consent of department.

599. Chemical Applications of Mass Spectrometry (0-0; 3-0)
Application of mass spectrometric measurements to problems in chemistry—gas and solid analysis, problems in reaction kinetics, organic structural analysis.

602. Departmental Research Seminar (2S-0; 2S-0)
Reports on studies of the literature or of current research in the Department. Required each year of all graduate students in the Department of Chemistry and the fourth year honors students.

604. Advanced Research Seminar (2S-0; 2S-0)
Reports on topics related to the fields of specialization of the graduate student. These seminars will be set up by the various members of staff as required.

611. Analytical Chemistry (3-1; 0-0)
Lectures of Chemistry 511.

613. Electroanalytical Chemistry and Polarography (3-0; 0-0)

615. Advanced Analytical Chemistry (3-0; 0-0)

617. Analytical Spectroscopy (0-0; 3-0)

631. Inorganic Chemistry (3-0; 0-0)
Lectures of the first term of Chemistry 530.

633. Selected Topics in Advanced Inorganic Chemistry (0-0; 3-0)
A study of selected topics including organometallic compounds, hydrides and metal carbonyls.
Prerequisite: Chemistry 530 or 631 and 635 or consent of department.

635. Inorganic Chemistry (0-0; 3-0)
Lectures of the second term of Chemistry 530.

651. Organic Chemistry (3-0; 0-0)
Lectures of Chemistry 550.

653. Organic Chemistry (0-0; 3-0)
Lectures of Chemistry 550.

657. Physical Organic Chemistry (0-0; 3-0)
A discussion of selected topics in physical organic chemistry. A continuation of topics discussed in Chemistry 555.
Textbook: Hammett, *Physical Organic Chemistry*.

670. Advanced Physical Chemistry (3-0; 3-0)

Kinetic theory of gases, quantum mechanics, statistical mechanics, chemical kinetics and photo-chemistry.
Prerequisite: Chemistry 372.
Prerequisite or corequisite: Mathematics 420 or 404.

671. Physical Chemistry (3-0; 0-0)

Lectures of 372.

673. Physical Chemistry (0-0; 3-0)

Lectures of 372.

675. Nuclear Magnetic Resonance Spectroscopy (0-0; 3-0)

The Bloch equations; analysis of simple spectra; theory of chemical shifts; the nuclear spin-spin interactions; application of NMR to various chemical problems.
Prerequisite: Chemistry 583 and Mathematics 404.

677. Physical Chemistry (3-0,0-0)

Lectures of the first term of 572.

679. Chemical Kinetics (0-0; 3-0)

Lectures of the second term of 572.

683. Quantum Chemistry (0-0; 3-0)

Prerequisite: Chemistry 583.

685. Solution Kinetics (0-0; 3-0)

The study of chemical reactions in non-polar and polar solvents; Debye-Huckel theory; primary and secondary salt effects; acid-base catalysis.
Textbook: Frost and Pearson, *Kinetics and Mechanisms.*
Prerequisites: Chemistry 372 and one of Chemistry 555 or 575.

COMPUTING SCIENCE

Professors—J. McNamee, D. B. Scott (Head)
Associate Professors—R. S. Julius (Assistant Head), K. W. Smillie, E. L. Whitney.
Assistant Professors—W. S. Adams, W. B. McMinn

460. Numerical Analysis (2-3; 2-3)

Matrix methods for linear algebraic equations of moderate order. Determination of eigenvalues and eigenvectors of matrices. Solution of algebraic and transcendental equations. Interpolation, tabulation, and economization. Algebra of operators. Numerical differentiation and integration. Numerical solution of ordinary differential equations and integral equations.
Prerequisites or corequisites: Mathematics 421, 422 and 425 or equivalent.

Graduate Courses

640. Advanced Numerical Analysis (3-3; 3-3)

Topics will be selected from problems and procedures of current interest in the field, and will include: Inversion and determination of eigenvalues and eigenvectors for large-order matrices; approximation of functions by orthogon-

al sets; uniform approximation; numerical integration in n-space; quadrature methods; solution of partial differential equations; stability of step-by-step methods; variational methods; linear and non-linear programming.
Prerequisite: Computing Science 460.
Co-requisite or prerequisite: Mathematics 500 or 600 or equivalent.

641. Automatic Digital Computers and Programming (3-6; 3-6)

Topics will be selected from problems of current interest in the field, and will include: Logical design of elementary machines: adders, decoders, control and memory systems. Elementary coding theory (error-correcting codes). Structural organisation of general purpose computers; current trends in structural design. Description of sequential processes by algorithmic languages, including numerical (machine) languages and current algebraic languages. Aids to programming: metaprograms, e.g., interpreters, compilers, assemblers, monitors.

Each student will be expected to solve several problems on a computer. Students should have a knowledge of elementary programming before entering this course.

Co-requisite: Computing Science 640.

ENTOMOLOGY

Instruction offered by members of the Department of Entomology, Faculty of Agriculture.

Honors in Entomology

The first year program must include the university equivalent of any one of Biology 30, Chemistry 30 and Physics 30 not taken in high school, English 200 or 210, and Physical Education. Other courses required during the program include Chemistry 230 and 250 or 350, Zoology 300 and 350, Botany 301 and 302, Entomology 201, 314, and one or more of 471, 476, 522, 556, and 560, Genetics 351, Biochemistry 300 or Plant Science 431 and 432, an approved language and two other Arts options. Recommended electives include Geology 201 and 305, Microbiology 360, Statistics 255 or Biometrics 455 and senior Botany, Genetics, and Zoology courses. Programs should be decided in consultation with the department.

Advice to General Program Students

Students may become acquainted with the subject by taking Entomology 201; they should have High School Biology 30 or the equivalent at University before doing this. Students contemplating specialization in Entomology should consult the department. A good background in science and especially in biology is a necessary preliminary.

201. General Entomology (3-3; 3-3)

Probable origin of insects, their structure and development. Introduction to classification. Their interrelationships with other forms of life as a basis to an appreciation of their significance in connection with agriculture and human health.
Textbook: Imms, *Outlines of Entomology*.
Prerequisite: Biology 30, 130, or 341 or equivalent.

341. Morphology (2-6; 2-6)
A detailed study of the structure of insects from the comparative and functional viewpoints.
Textbook: Snodgrass, *Principles of Insect Morphology.*
Prerequisite: Entomology 201 (301).

476. Insect Toxicology (2-4; 2-4)
The chemistry of insecticides and repellents and of accessory materials. Methods of insecticide evaluation. Theories of insecticidal activity.
Textbook: Shepard, *The Chemistry and Action of Insecticides.*
Prerequisite: Chemistry 250 or 350, Entomology 200 or 201 desirable.

522. Taxonomy (2-6; 2-6)
Taxonomic principles and procedures. Classification of insects; habits of all important groups. Zoological nomenclature, speciation, phylogeny, zoogeography.
Textbook: Mayr, Linsley, and Usinger, *Methods and Principles of Systematic Zoology.*
Prerequisite or corequisite: Entomology 201, Entomology 314 (414) desirable.

556. Insect Physiology (2-5; 2-5)
Life processes illustrated by insects with emphasis on those peculiar to them and their relatives.
Textbook: Wigglesworth, *The Principles of Insect Physiology.*
Prerequisite or corequisite: Entomology 201, Entomology 314 desirable.

560. Insect Ecology (2-5; 2-5)
The relationships of insects to their environment with emphasis on the factors which influence the distribution of insects in time and space. Associations between insects and other organisms. Populations.
Prerequisite: Entomology 201, or Entomology 200 and 471.

610. Advanced Morphology and Histology
A continuing course from Entomology 314, including a detailed study of internal structure. Credit according to work done, up to a maximum of one full course.

621. Advanced Taxonomy (0-6; 0-6)
Classification and biology of, and literature on, one or more of the major orders of insects.
Prerequisite: Entomology 522.

650. A Project in Insect Physiology
A review and interpretation of the literature on a selected topic with an experimental study of a related problem. Credit according to work done up to a maximum of one full course.

GENETICS

Professors—C. O. Person (Head), L. P. V. Johnson, J. Weijer
Associate Professors—J. Kuspira, K. A. Lesins, W. E. Smith, G. W. R. Walker
Instructor—Frances Miller
Associate Members—R. T. Berg, Peter Bowen, W. Combs, R. T. Hardin, R. F. Ruth

Honors in Genetics

The Honors program in Genetics is designed primarily to prepare students for advanced studies that may lead to higher degrees and to research and academic careers. To some extent the program can be fitted to individual needs. A final comprehensive examination will test the student's general knowledge of facts and principles.

A student choosing the Honors program is requested to meet the Head of the Department of Genetics as early as possible, in order to draw up his course program.

Provision for summer employment of Honors students in Genetics can usually be made. During their senior years it is expected that Honors students will assist as demonstrators in elementary laboratories.

First Year

Biology 130 or 230; Chemistry 230; English 200 or 210; Mathematics 180 or 201; an approved option; Physical Education.

Second Year

Genetics 351; Chemistry 350; Physics 100 or 200; an approved course in Biological Science (Biology 230 if not taken in first year); an Arts option.

Third Year

Biochemistry 300; two approved courses in Genetics; one approved course in Biological Science; an Arts option.

Fourth Year

Two approved courses in Genetics; two approved courses in Biological Science; an Arts option.

351. Genetics **(3-3; 3-3)**

A fundamental course in genetics covering the following basic principles and processes: Physical bases of heredity, Mendelian inheritance, inheritance of sex, linkage, quantitative inheritance, gene structure and function, gene mutation and chromosomal aberrations, populations and races, developmental genetics, cytoplasmic inheritance, human genetics and eugenics, and additional topics.

Textbook: Snyder and David, *Principles of Heredity*.

411. Cytology **(3-3; 0-0)**

Structural and biochemical organization of the cell in relation to metabolism, division, and differentiation with emphasis on nucleus and chromosomes. The application of classical and modern analytical techniques of cytology in the laboratory.

Prerequisite: Genetics 351.

413. Chromosome Mechanics **(3-3; 0-0)**

Detailed analysis of the genetic control of meiotic and mitotic events, analysis of crossing over and its mechanisms, position effects, position pseudoalleles, and genetic behavior of chromosome aberrations.

Prerequisite: Genetics 351.

(Not offered in 1964-65)

415. Cytogenetics (0-0; 3-3)

Advanced topics in cytogenetics: chromosome structure; cytogenetic behavior and evolution of chromosome aberrations; polyploidy and aneuploidy; sex determination; balanced-lethal systems; karyotype analysis; endomitosis; chromosome diminution and elimination.

Prerequisite: Genetics 351.

430. Microbial Genetics (3-0; 0-0)

Detailed analysis of genetic phenomena peculiar to micro-organisms. Transduction; transformation; tetrad analysis; copy-choice mechanisms; heterokaryosis and parasexuality.

Prerequisite: Genetics 351.
Textbook: Herskowitz, *Genetics.*

463. Genetic Basis of Plant Breeding (0-0; 3-0)

Emphasis is placed on principles rather than materials and methods in approaching the breeding of plants classified as to reproductive systems. Coverage includes polyploidy and aneuploidy, interspecific hybridization: induced mutation, selection responses, heterosis, and breeding for disease resistance.

Prerequisite: Genetics 351.

465. Human Genetics (0-0; 3-0)

An introductory course in human genetics covering modes of transmission of hereditary traits, pedigree analysis, interaction of heredity and environment, chromosomal anomalies, tissue culture, sex determination, physiological genetics. Application of genetics in medicolegal usage, heredity counselling, and eugenics.

Prerequisite: Genetics 351.

481. Population Genetics (3-0; 0-0)

Gene behavior in populations; influence of mutation, migration, genetic drift and selection. Genetics of natural selection and evolution.

Prereqiusite: Genetics 351 or equivalent.

517. Genetical Statistics (3-3; 0-0)

Principles and methods of biometrical analyses applied to specific genetic problems such as quantitative inheritance and linkage. Adaptation of standard designs to genetic experimentation. Emphasis throughout is on effective experimental planning and critical interpretation of genetic data.

Prerequisite: Genetics 351.

545. Biochemical Genetics (0-0; 3-0)

The genetic control of protein synthesis, nucleocytoplasmic relationships, the molecular meaning of genetic recombination and mutation, biochemical approaches to the coding problem.

Prerequisite: Genetics 351.
(Not offered in 1964-65)

552. Radiation Genetics (0-0; 3-3)

The biological effects of ionizing and non-ionizing radiation upon chromosomes and cells, mutagenesis in the broad sense, target theory, protectors, radioactive isotope studies.
Prerequisite: Genetics 351.

583. Evolutionary Genetics (3-0; 0-0)

Chromosomal changes, polyploidy, hybrid sterility and other factors leading to genetic isolation; meiotic drive, genetic feed-back and other micro-evolutionary processes; evolution of parasitism, mimicry and other systems that involve balanced polymorphism.
Prequisite: Genetics 351.

586. Developmental Genetics (0-0; 3-0)

Detailed study of gene-controlled processes of development and differentiation; lethal factors; use of genetic markers to study cell lineage; mechanism of differential gene activation by controlling elements; cytoplasmic influences; phenocopies.
Prerequisite: Genetics 351.

590. Classic Contributions in Genetics (3-0; 0-0)

Designed to acquaint students with papers which have stimulated rapid advances in genetics by introducing a new basic concept or technique. An historical approach will begin with Mendel's papers and develop through Morgan, Bridges, Sturtevant, Muller, Stadler, Stern, Beadle and Tatum, Auerbach, Watson and Crick, Benzer. Nirmberg and Matthaei and others.
Prerequisite: Genetics 351.
(Not offered in 1964-65)

601. Genetics Seminar (1-0; 1-0)

Prerequisite or corequisite: Biochemistry 300.

610. Current Problems in Genetics (0-0; 3-0)

Detailed discussion of current literature designed to acquaint the student with the active areas of modern genetic research; student participation is expected in both discussions and presentation of lectures.

635. Advanced Microbial Genetics (0-4; 0-4)

An advanced laboratory conference course dealing with genetics of fungi, bacteria and bacteriophages.

640. Advanced Genetics (0-0; 3-0)

A seminar course for detailed analysis of a specific area of current interest. The topic will be changed from year to year. The course will comprise lectures by staff members, student reports on assigned topics, and informal discussion.

650. Genetics of Parasitic Systems (3-0; 0-0)

Genetic aspects of parasitism, including Flor's hypothesis of gene-for-gene relationships, applications of the gene-for-gene concept, and methods used in analysing complex parasitic systems.

GEOGRAPHY

Professor—W. C. Wonders (Head)
Associate Professors—J. F. Bergman, J. J. Klawe, A. H. Laycock, R. W. Longley, P. J. Smith
Assistant Professors—K. V. Abrahamsson, R. G. Ironside, J. D. Wood.

The Department offers both the B.A. and the B.Sc. degrees with Honors in Geography. Students wishing to stress the humanities and social sciences should register in the B.A. program; those who wish to stress the physical and biological sciences should register in the B.Sc. Program.

B.Sc. with Honors in Geography

First Year

Geography 201; English 200 or 210; Geology 201; one of Biology 130, Biology 230; one of Mathematics 200 or 201, Statistics 255, Physics 240, Chemistry 230; Physical Education.

Second Year

Geography 300; Geography 301; Geography 303; two approved Science options.

Third Year

Geography 400; one of Geography 302, 401, 405, 410, 416 or 418; one approved Arts option; Zoology 321 and Botany 321; one approved Science option.

Fourth Year

Geography 502; an approved second senior Geography course; one approved option in Geology; one approved Science option; one approved option. Students are required to have a reading knowledge of French or German. At the end of the fourth year a candidate for honors will be required to take an oral or written examination in the field of Geography.

Advice to General Program Students

Students interested in Geography as an area of concentration may focus on courses leading to a B.A. or B.Sc. degree. In either case, the following sequences are recommended:

Three course sequence: Geography 201, 300 and one other senior Geography course.

Four course sequence: Geography 201, 300 and two other senior Geography courses.

Five course sequence: Geography 201, 300, 301, a regional course and one other senior Geography course.

Students interested in graduate work in geography should consult the department.

NOTE: Descriptions of Geography 300, 400 and other courses considered as Social Sciences will be found in the Calendar of the Faculty of Arts.

201. Physical Geography (3-2; 3-2)

A systematic study of the origin, nature, and distribution of the natural environment. Land forms, weather and climate, vegetation, soils, water, and

mineral resources will be related to each other in place. The laboratory work will complement the lectures and will include interpretation, study, and preparation of maps and charts.

301. Cartography (6L; 6L)
This course introduces and explains cartography as the graphic representation of the earth. Among the topics covered are: reference grids; major projections; documentation of data (survey); processing of data (map compilation and reproduction); classification of maps; thematic maps; Canadian and foreign mapping. The practical work is designed to train students in cartographic expression and map appreciation.

303. Weather and Climate (3L-0; 3L-0)
A systematic study of weather processes and phenomena, regional weather patterns, climatic classification, and climates of the continents with some consideration of climatic trends. Laboratory work will include the interpretation of weather and climatic maps and local weather patterns.
Prerequisite: Geography 201 or consent of the department.

305. General Cartography (6L; 6L)
This course is similar to course 301, Cartography, but is adapted to the needs of students who have not chosen geography as their major field of learning.

401. Advanced Physical Geography (3L-0; 3L-0)
A study of climate, vegetation, soil, water and landforms with stress upon local, regional and world patterns of each.
Prerequisite: Geography 201 or consent of the department.

405. Introduction to Theoretical Meteorology (3L-0; 3L-0)
This course is identical to Physics 405.
A study of the physics of the atmosphere, including thermodynamics, stability, equations of motion, friction and turbulence, mechanics and structure of cyclones and anticyclones.
Prerequisite: Mathematics 201, Physics 240.

409. Advanced Cartography (6L; 6L)
The emphasis in this course is on problems of map resign; compilation of derived and thematic maps and editorial work.
Prerequisite: Geography 301 or Geography 305 or consent of Department.

418. Geography of Water Resources (3L-0; 3L-0)
A study of local, regional and world patterns of water supply and demand. Precipitation, evapotranspiration, streamflow, soil moisture, ground water and the management of watershed regions. Domestic, municipal, industrial, irrigation, hydro-power, navigational, fishing, recreational and other demands and the problems of supply, modification and allocation.
Prerequisite: Geography 201 or consent of Department.

501. Air Photo Interpretation (6L; 6L)
A study of the physical and cultural geography depicted on vertical and oblique air photos. Interpretation techniques, field use of photos and the elements of photogrammetry.
Prerequisite: A course in Geography or consent of the Department.

502. Reading and Seminar Course

525. Field School in Geography

A survey of the geography of a selected region. Field studies for a week in September preceding registration, followed by the preparation of reports on specified topics. Reconnaissance and micro-studies employing geographical field techniques. Required of candidates for the Master's degree in Geography.

551. Research in Physical Geography

553. Special Problems

GEOLOGY

Professors—H. S. Armstrong, R. E. Folinsbee (Head), C. R. Stelck

Associate Professors—H. Baadsgaard, R. A. Burwash, F. A. Campbell, H. A. K. Charlesworth, J. F. Lerbekmo

Assistant Professors—A. J. Broscoe, D. E. Jackson

Postdoctoral Fellows—M. H. Dodson (Ph.D. Oxford), M. E. Philcox (Ph.D. Dublin)

Honors in Geology

First Year

Geology 201; Physics 240; Mathematics 201; English 200 or 210; an Arts option; Physical Education.

Second Year

Geology 303, 304, 305, and 306; Chemistry 230; Physics 340; one option* approved by the Department.

Third Year

Geology 401, 402, 403, 404, 405, 464, and 467; Chemistry 370; one option* approved by the Department.

Fourth Year

Five or six of the following: Geology 406, 407, 409, 410, 460, 461, 462, 465, and 466; Physics 420; one option* approved by the Department; a comprehensive examination.

---

*One Arts options must be included.

Honors in Physics and Geology

See under Department of Physics.

Honors in Geology and Zoology

The Honors Zoology and Geology course is intended to prepare students, especially those with an interest in palaeontology, for a career in either zoology or geology. By arrangement with his adviser a student may select from a range of courses in Zoology and Geology, depending on his interests and abilities. The following pattern may be considered as typical of the Honors Zoology and Geology program:

First Year

Biology 130 or 230*, Geology 201, Mathematics 201 or Physics 200, English 200 or 210, one Arts option, Physical Education.

Second Year

Biology 230 or Botany 301*, Zoology 350, Geology 305, Geology 306, Chemistry 230, one Arts option.

Third Year

Zoology 300, Geology 403, Geology 407, Genetics 351, Chemistry 350, one Arts option, Zoology 525.

Fourth Year

Zoology 440, any two of Zoology 406, 408, 462, 521; Geology 405, Geology 410, Biochemistry 300, one Science option, Geology 467.

---

*Students without Biology 30 are required to take Biology 130 in their First Year and Biology 230 in their Second Year; students with Biology 30 should take Biology 230 in their first year and Botany 301 in their second year.

Advice to General Program Students

Students interested in geology may take the equivalent of one to five full courses in this subject. The sequence of courses to be taken is left to each student and is controlled only by the prerequisites listed under the course descriptions. A three-year B.Sc. degree with a five-course concentration in geology can serve as preparation for either graduate work in geology or a geological career in industry if followed, in the latter case, by a fourth year of course-work in geology. A student enrolled in the three-year program may switch to the four-year Honors Geology program after the first year, or, in most cases, after the second year.

Junior Courses—

201. General Geology (3-3; 3-3)
Processes of destruction and reconstruction; interpretation of physiographic features with map study; stratigraphic column with index fossils from each period; common minerals and rocks.

202. Physical Geology (3-3; 0-0)
An introduction to the study of the earth; materials of the earth's crust; minerals and rocks; geologic processes and time.

203. Historical Geology (0-0; 3-3)
Geologic history with special reference to North America; stratigraphic column with index fossils from each period.
Prerequisite: Geology 202 or Geography 201.

Senior Courses—

302. Geology and Mineral Deposits of Canada (3-3; 3-3)
The study of the geologic regions of Canada; their stratigraphy, structure, and mineral deposits.
Prerequisite: Geology 201 or consent of department.

303. Crystallography (3-3; 0-0)
Crystal and chemical principles are applied to crystallography in order to explain the physical properties of minerals; an introduction to the theory and practice of X-ray powder diffraction is given.
Prerequisite: Geology 201 and Mathematics 201, or consent of department.

304. Optical Mineralogy (0-0; 3-3)
Optical crystallography; physical and optical properties of the rock-forming minerals.
Prerequisite: Geology 303.

305. Principles of Palaeontology (3-3; 0-0)
Morphology, palaeoecology, and evolution of the Porifera, Coelenterata, Brachiopoda, Mollusca, Echinoderma, and Trilobita.
Prerequisite: Geology 201 or consent of department.

306. Principles of Sedimentation and Stratigraphy (0-0; 3-3)
Sedimentary processes, environments and facies; properties and classification of sedimentary rocks; stratigraphic nomenclature and the stratigraphic column; principles of stratigraphic palaeontology.
Prerequisite: Geology 201 or consent of department.

401. Igneous and Metamorphic Petrology (3-3; 0-0)
The mineralogy, classification and genesis of igneous and metamorphic rocks; microscopic study of representative samples of the major rock classes.
Prerequisite: Geology 304 and 306.

402. Principles of Structural Geology (3-3; 0-0)
Theoretical structural geology; non-orogenic structure; faults; folds; elementary petrofabric analysis; problems on folding and faulting.
Prerequisite: Geology 303 and Physics 240, or consent of department.

403. Stratigraphy (I) (3-3; 0-0)
Historical geology of North America from the Precambrian to the Devonian; Cambrian to Devonian stratigraphic palaeontology.
Prerequisite: Geology 305 and 306.

404. Mineralogy (0-0; 3-3)
A systematic study of minerals, their chemical and physical properties and modes of occurrence; petrographic, mineralographic, and X-ray diffraction techniques are employed in the laboratory.
Prerequisite: Geology 304 or consent of department.

405. Stratigraphy (II) (0-0; 3-3)
Historical geology of North America from the Carboniferous to the Cenozoic; Carboniferous, Permian, Mesozoic and Cenozoic stratigraphic palaeontology.
Prerequisite: Geology 305 and 306.

406. Geotectonics (0-0; 3-3)
Origin and gross tectonic framework of ocean basins, continental margins and continents; causes of orogenesis; structural geology of North America; problems on folding and faulting; interpretation of geologic maps.
Prerequisite: Geology 402.

407. Palaeontology (0-0; 3-3)
Morphology, palaeoecology and evolution of the lesser invertebrates, vertebrates, and plants.
Prerequisite: Geology 305, Zoology 220 or Botany 201, or consent of department.

409. Geochemistry (3s; 0-0)
A survey of chemical processes taking place in geologic settings with emphasis on the abundance relationships of the elements and nuclides in the earth's crust and the laws governing the migration and distribution of the elements of the earth.
Prerequisite: Geology 401 and Chemistry 370, or consent of department.

410. Micropalaeontology (3-3; 0-0)
Principles of micropalaeontology, techniques, systematic treatment of Foraminifera.
Prerequisite: Geology 305.

460. Metallic Mineral Deposits (0-0; 3-3)
Classification, mode of occurrence, and geological relations of various types of mineral deposits.
Prerequisite: Geology 402 and 404 or consent of department.

461. Geology of Petroleum, Natural Gas and Coal (3-3; 0-0)
Classification, mode of occurrence and geological characteristics of petroleum, natural gas and coal deposits.
Prerequisite: Geology 306 and 402 or consent of department.

462. Photogeology (1-3; 0-0)
The application of aerial photographs to the preparation of planimetric and geological maps.
Prerequisite: Geology 201 or consent of department.

464. Introductory Sedimentary Petrology (0-0; 3-3)
Processes of sedimentation; weathering, transportation, deposition, diagenesis; classification and description of sedimentary rocks.
Prerequisite: Geology 304 and 306.

465. Geomorphology (3-3; 0-0)
A study of land forms and the processes which create and modify them; map reading; field trips.
Prerequisite: Geology 201 or consent of department.

466. Glacial Geology (0-0; 3-3)
A study of glacial features and their relation to physiographic environment; field trips.
Prerequisite: Geology 201 or consent of department.

467. Field School
A ten-day field school for third year students to be held at Cranbook, B.C., following the Spring examination period. Topographic and geologic mapping techniques; detailed mapping of the stratigraphy and of the primary and secondary structures of a small highly deformed area.
Prerequisite: Geology 402, 403 or consent of department.

Honor and Graduate Courses—

501. Advanced Structural Geology (0-0; 3-0)
Advanced structural topics will be treated on a seminar basis.
Prerequisite: Geology 402 and 406 or consent of department.

502. Sedimentary Petrology and Sedimentation (2-0; 2-0)

Papers on sedimentary topics will be presented at a weekly seminar. Normally the first term will be spent largely on papers dealing with mechanical sedimentation and the second term on chemical sedimentation.

Prerequisite: Geology 464.

503. Advanced Stratigraphy (3-3; 3-3)

507. Advanced Igneous and Metamorphic Petrology (0-0; 3-3)

Discussion of classic and recent papers dealing with genesis of igneous and metamorphic rocks. Laboratory study of representative suites of thin sections.

Prerequisite: Geology 401 or consent of department.

508. Precambrian Geology (3-3; 0-0)

A study of the geological record of Precambrian time, with special reference to the Canadian Shield.

Prerequisite: Geology 401 and 403.

510. Advanced Mineralogy (6L; 6L)

A study of minerals using petrographic, mineralographic, and X-ray techniques with a view to interpretation of problems.

Prerequisites: Geology 401 and 404.

511. Regional Structural Geology (0-0; 3-3)

The geological structure of certain areas in different parts of the world will be studied on a seminar basis.

Prerequisite: Geology 402 and 406 or consent of department.

512. Pleistocene Geology (0-0; 3-0)

Pleistocene history of both glaciated and non-glaciated areas, especially North America, Europe and the Mediterranean region. The effects of Pleistocene climatic changes of soils, biogeography and archaeology.

Prerequisite: Geology 459 or consent of department.

513. Field Work in Geomorphology and Glacial Geology

Mapping of surficial deposits and landforms of selected areas in central Alberta. One day of field work each week ($\frac{1}{2}$ year course).

Prerequisite: Geology 459 or consent of department.

514. Rock Analysis (1-3; 0-0) or (0-0; 1-3)

The quantitative chemical analysis of silicate rocks. Problems in sampling, solution, separations and final determination of the constituents are discussed.

Prerequisite: Chemistry 312 or consent of department.

515. Advanced Micropalaeontology (2s-4; 0-0) or (0-0; 2s-4)

517. Advanced Geochemistry (0-0; 3-3)

609. Geological Research (0-8; 0-0) or (0-0; 0-8)

610. Isotope Geology (0-0; 3-0)

The investigation and elucidation of geologic phenomena by means of variations in the natural isotopic composition of the elements; abundance of the naturally occurring nuclides; isotopic fractionation; radioctivity; geochronology.

Prerequisite: Consent of department.

611. Palynology (3s-3; 0-0) or (0-0; 3s-3)

612. Ore Deposits (3s-0; 0-0)

HOUSEHOLD ECONOMICS

Instruction offered by members of the School of Household Economics.

210. Foods and Nutrition (3-3; 3-3)

An elementary study of the composition and nutritive value of foods, with laboratory practice in food preparation, meal planning and service.

Textbooks: Hughes, *Introductory Foods;* Bogert, *Nutrition and Physical Fitness.*

NOTE: Not more than one of Household Economics 210 or Household Economics 350 (Applied Art) may be taken for credit. Household Economics 210 may not replace one of the three laboratory science courses required in the General Program leading to the B.A. degree.

MATHEMATICS

Professors—A. L. Dulmage (Head), E. S. Keeping (Sessional), A. E. Livingston, L. Lorch, J. McNamee, L. Moser, M. Wyman.

Associate Professors—W. J. Bruce, G. C. Cree, D. R. Crosby, T. Fostvedt, W. Israel, R. C. Jacka, H. F. J. Lowig, J. R. McGregor, T. V. Narayana, E. Phibbs, J. R. Pounder, J. Sanders, A. Sharma, M. V. Subba Rao, E. L. Whitney.

Assistant Professors—F. A. Baragar, R. Bercov, T. A. Burton, B. S. Chwe, R. L. McKinney, K. L. Mehra, J. W. Moon, M. G. Murdeshwar, R. G. Sinclair, R. J. Tait, J. R. Trollope, D. W. Willett, J. S. W. Wong

B.Sc. with Honors in Mathemaics

First Year

Mathematics 206 and 271; Statistics 256; Physics 244; one Arts option; Physical Education.

Second Year

Mathematics 306, 308 (half-year course), 309 (half-year course), and 360; one Science option; one Arts option.

Third Year

Mathematics 421, 423, 425 and 426, one approved option (preferably Mathematics 360), and one Arts option.

Fourth Year

Mathematics 501 and 540, three approved options (one of which is preferably Mathematics 510).

NOTES: The program must be approved by the Department of Mathematics. Students who hope to do graduate work in mathematics should select two of the open options in third and fourth year from Mathematics or Mathematical Physics.

The Arts options may include beginners' language courses such as German 210 or Russian 210.

Honors in Applied Mathematics

The B.Sc. degree with Honors in Applied Mathematics may be taken by students who wish to specialize in mechanics, including hydrodynamics, aerodynamics, elasticity and the theory of relativity.

First Year

As above.

Second Year

As above. The Science option should preferably be Physics 380.

Third Year

Mathematics 421, 425, 426 and 430; one approved option from Physics or Mathematics, or Geography 405; one Arts option.

Fourth Year

Mathematics 500 or 501, Mathematics 540, Physics 550, two approved options from Mathematics or Physics (preferably from Mathematics 460, 510, 550, 555, 580, Physics 510, 570).

NOTE: The program must be approved by the Department of Mathematics. The Arts options may include beginners' language courses such as German 210 and Russian 210.

Advice to General Program Students

Students planning to take mathematics as a subject of concentration are advised to consult the department as early as possible regarding the choice of their courses. Fundamental courses are Mathematics 201 or 207, Mathematics 270 or 274, and Mathematics 304. For students wishing to proceed to graduate work in mathematics, the sequence Mathematics 201, 304, and 404 is essential. Students wishing to enter the teaching profession are advised to include Mathematics 207, Statistics 255, Mathematics 274 and 374.

100. Elements of Algebra (3-0; 3-0)

The topics of Mathematics 30.

101. Trigonometry (2-0; 0-0)

Trigonometric functions and identities. Solution of triangles.

Prerequisite: 70% standing in Mathematics 30 and 70% standing in the required courses of Grade XII or special permission of the Dean.

NOTE: This course cannot be taken for credit towards a degree.

180. Trigonometry and Polynomial Calculus (4-0; 4-0)

Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentation and integration of elementary functions. Applications.

Prerequisite Mathematics 30.

201. Introductory Calculus **(3-2; 3-2)**
Rates of change. Differentiation and integration of simple functions. Applications. Analytic geometry of the conic sections. Exponential, logarithmic and trigonometric functions.
Prerequisite: Mathematics 30 and 31 or their equivalent.
Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 201 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101.)

206. Calculus **(5-0; 5-0)**
Functions. The derivative, differential and anti-differential. The integral and its applications. Fundamental Theorem. Differentiation and integration of elementary functions of one or more variables. Simple differential equations.
Prerequisite: Mathematics 30 and 31.
NOTE: This course is required of first year Honors students in Mathematics and Physics. Other students admitted only with the consent of department.

207. Elementary Calculus (Arts and Education) **(5-0; 5-0)**
Real numbers. Functions and graphs. Differentiation and applications. Analytic geometry. Integration and applications. Trigonometric, exponential and inverse functions.
Prerequisite: Mathematics 30 and 31 or their equivalent.
Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 207 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101.)

220. Elementary Calculus **(3-0; 3-0)**
Differentiation and integration of trigonometric functions. Polar co-ordinates. Logarithmic and exponential functions. Conic sections. Areas and volumes.
Prerequisite: Mathematics 180.

250. Theory of Finance **(3-0; 3-0)**
Application of percent, interest, annuities certain, sinking funds and amortizations, valuations of bonds, depreciation, and computer programming in finance.
Prerequisite: Mathematics 30.

260. The Nature of Mathematics **(3-0; 3-0)**
A survey of the history, methodology, achievements and goals of mathematics, with illustrations from elementary geometry, topology, number theory, algebra and analysis.
This is a terminal course for students not intending to proceed with Mathematics. It is not an option in the Mathematics pattern.
Prerequisite: Mathematics 30.

270. Introduction to Algebra and Geometry **(3-0; 3-0)**
Structure of the number system. Mathematical induction. Binomial and multinomial theorems. Sets. Logic of simple and compound statements. Vectors and lines. Inner products. The complex plane. Vector geometry. Matrix algebra. Groups of transformations.
Prerequisite: Mathematics 30.

271. Algebra and Geometry (Honors) (3-0; 3-0)

Sets. Mathematical logic. Number systems. Co-ordinates. Mathematical induction. Binomial theorem. Remainder theorem. Lines and planes in analytic geometry. Vectors. Linear transformations and matrices. Groups of transformations of co-ordinates. Geometric invariants. Determinants. Conic sections. Principal axis theorems.

Prerequisite: Mathematics 30 and 31.

NOTE: This course is required for first year Honors students in Mathematics and Physics. Other students admitted only with the consent of the department.

274. Algebra and Geometry (3-0; 3-0)

Logic and sets. Axiomatic geometry. Projective geometry. Rotation of axes. Graphs of polynomial functions. Linear equations. Vectors, matrices and determinants. Mathematical systems (scales of notation). Mathematical induction. Binomial theoren. The axiomatic approach to the number system. General algebraic systems.

Prerequisite: Mathematics 30

Senior Courses—

304. Calculus and Analytical Geometry (3-2; 3-2)

Determinants. Polar and parametric coordinates. Methods and applications of integration. Infinite series. Vectors and space geometry. Partial differentiation. Complex numbers. Multiple integrals. Elements of differential equations.

Prerequisite: Mathematics 201 or 220.

306. Advanced Calculus (5-0; 5-0)

Number systems, limits, least upper bound, mean value theorem, the Riemann Integral, Taylor's theorem, the improper integral, infinite series, uniform convergence, implicit function theorem, multiple integrals, exact differential forms, calculus of variations, rotations in three-dimensional space, quadratic forms, geometric invariants, vector differentiation, the Serrat-Frenet formulae.

Prerequisite: Mathematics 206 or consent of department.

Prerequisite or corequisite: Mathematics 271.

Note: This course is required for second year Honors students in Mathematics and Physics. Other students admitted only with the consent of department.

307. Calculus and Analytic Geometry (Arts and Education) (5-0; 5-0)

Polar coordinates. Rotation of axes. Analytical geometry of three dimensions. Partial derivatives. Multiple integrals. Sequences and series. Introductory differential equations.

Prerequisite: Mathematics 207.

308. Differential Equations (3-0; 0-0)

First-order equations. Equations with constant coefficients. Linear equations of the second order. Systems of equations. Sturm-Liouville theorem and orthogonal expansions.

Prerequisite: Mathematics 206.

NOTE: This course is required of second year Honors students in Mathematics

and Physics. Other students admitted only with the consent of department.

309. Mechanics (0-0; 3-0)
Foundations. Statics and the principle of virtual work. Plane kinematics. Plane motion of a particle and rigid body. Conservation laws. Harmonic oscillator. Motion in a central field. Planetary orbits.
Prerequisite: Mathematics 308 and Physics 244 (or 240).

NOTE: This course is required of second year Honors students in Mathematics. Other students admitted only with the consent of department.

310. Elementary Mechanics (3-0; 3-0)
Newton's Laws. Plane statics. Systems of forces. Centre of mass. Friction. Principle of virtual work. Thin beams. Plane kinematics and dynamics of a particle. Projectile motion. Circular motion and simple harmonic motion. The conservation laws. Stability of equilibrium. Plane motion of a rigid body. Impulsive motion.
Prerequisite: Mathematics 201 or equivalent.
Corequisite: Mathematics 304 or equivalent.

320. Statistical Treatment of Experimental Data (1-0; 1-0)
Errors of observation, systematic and random. Frequency distributions. The mean and standard deviation. The binomial and Poisson distributions. The Gaussian law of error. Two-variable problems—regression and correlation. Fitting of curves by least squares. Relation between sample and population. Confidence limits. Significance of experimental results.
Prerequisite: Mathematics 306.

NOTE: This is a required course in the Honors Physics program. It will be admissible in other programs only as an extra.

360. Geometry (3-0; 3-0)
Various concepts of space (Euclidean, affine, projective and non-Euclidean), axiomatic treatment and models, relation to group theory. An introduction to point set topology (open and closed sets, Hausdorff and metric spaces).
Prerequisite or corequisite: Mathematics 304 or 306 or consent of repartment.

374. Algebra and Geometry (3-0; 3-0)
Selected topics in projective and other non-Euclidean geometries. Groups, rings, fields. Vector spaces. Lattices and Boolean algebra.
Prerequisite: Mathematics 207 and 274 or consent of the department.

404. Advanced Calculus (3-0; 3-0)
Vector analysis. Ordinary differential equations. Series solutions of differential equations. Gamma, Bessel and Legendre functions. Fourier series. Boundary value problems.
Prerequisite: Mathematics 304.
(This course is available to Honors Chemistry students and to students in the Mathematics and Physics pattern.)

421. Boundary Value Problems (2-0; 2-0)
Partial differential equations of mathematical physics, Bernoulli's separation of variables, series solutions, existence and uniqueness theorems, Sturm-Liouville

systems, eigenvalues and eigenfunctions, classical orthogonal functions, Fourier series and integrals. (For Honors students in Mathematics and Physics)
Prerequisite: Mathematics 306 or consent of the department.

423. Differential Geometry (2-0; 2-0)
Theory of surfaces. Quadratic differential forms. Geodesics and curvature. Riemannian manifolds. Exterior differential forms. (For Honors students in Mathematics or Physics.)
Prerequisite: Mathematics 306 and 308.

424. Number Theory (0-0; 3-0)
Fundamental Theorem of Arithmetic. Representation of numbers. Continued fractions. Linear congruences. Elementary theory of arithmetic functions. Theorems of Euler, Fermat and Wilson. Sum of squares. Quadratic reciprocity.
(For B.A. Honors students in Mathematics)
Prerequisite: Mathematics 271.

425. Modern Algebra (2-0; 2-0)
Integral domains. Congruences. Fields. Real numbers. Polynomials. Complex numbers. Groups. Vector spaces. Matrix algebra. Linear groups.
Prerequisite: Mathematics 271 and 306 or equivalent.

426. Complex Variables (2-0; 2-0)
Complex numbers. Functions of a complex variable. Cauchy-Riemann equations. Cauchy's Theorem. Calculus of residues. Conformal mapping. (For Honors students in Mathematics and Physics.)
Prerequisite: Mathematics 306 or 404 or 405 or 406 or 407.

430. Advanced Mechanics (3-0; 3-0)
Central orbits. Scattering theory. Harmonic oscillator. Normal modes of vibrations. Space motion of a rigid body. Relative motion. Tops and gyroscopes. D'Alembert's principle. Generalized coordinates. Lagrange's equations. Hamilton's principle.
Prerequisite: Mathematics 303, 304, or 306, and a course in elementary statics and dynamics.

Honor and Graduate Courses—

500. Theory of Functions of a Complex Variable (3-0; 3-0)
Complex numbers. Complex series. Functions of a complex variable. Cauchy's theorem and the calculus of residues. Integral functions. Conformal representation. The Laplace and Fourier transforms.
Prerequisite: Mathematics 404 or 405 or 406 or 407.
NOTE: Only one of Mathematics 500 and 501 may be taken for credit towards a degree.

501. Theory of Functions of a Complex Variable (3-0; 3-0)
The complex number system. Complex-valued functions. Convergence of series. Complex integration. Representation theorems. Calculus of residues.
Prerequisite: Mathematics 421 and 422 or consent of department.
NOTE: Only one of Mathematics 500 and 501 may be taken for credit towards a degree.

502. History of Mathematics (2-0; 2-0)
The Alexandrian School and the foundations of geometry. Saccheri and the beginnings of modern geometry. The renaissance of algebra in Europe, the Arabic Heritage. Cartesian, metric and projective geometrics. Development of calculus and mechanics. Logical foundations of mathematics.
(For B.A. Honors students in Mathematics)
Prerequisite: Mathematics 306 and 360.

510. Modern Algebra (3-0; 3-0)
Peano's axioms and their development. Structure theory of groups and rings. Galois theory. Valuation theory of fields. Lattice theory and Boolean algebras.
Prerequisite: Mathematics 425.

515. Number Theory (3-0; 3-0)
Divisibility; congruences; primitive roots; quadratic reciprocity. Number-theoretic functions and the distribution of primes. Diophantine problems. Rational approximations to real numbers.

520. Differential Geometry (3-0; 3-0)
Survey of classical differential geometry. Curvature of curves and surfaces. Synthetic differential geometry. Axiomatic treatment of topological and general metric spaces. Applications to non-euclidean, Riemannian, Finsler and Busemann spaces.

540. Theory of Functions of a Real Variable (3-0; 3-0)
Introduction to set theory. The number system. Real and complex numbers. Cardinal and ordinal numbers. Stieltjes integrals. Measure theory. Lebesgue integrals.
Prerequisites: Mathematics 421, 422 and 425, or equivalent.

550. Generalized Dynamics and Special Relativity Theory (3-0; 3-0)
Variational principles. Virtual work. Lagrangian and Hamiltonian equations. The Hamilton-Jacobi equation. The Lorentz transformation. Relativistic mechanics.
Prerequisite: Mathematics 430 or equivalent.

555. Hydro- and Aero-dynamics (3-0; 3-0)
Classical hydrodynamics. Kutta-Joukowski theory of airfoils. Boundary layers. Flow of a viscous fluid. Supersonic flow. Shock waves.

580. Tensor Analysis (3-0; 3-0)
Algebra of tensors. Covariant differentiation. Applications of tensorial methods to the geometry of curves and surfaces, analytical dynamics, elasticity, the special and general theories of relativity, and cosmology.

600. Analysis (3-0; 3-0)
Linear transformations. Orthogonal functions. Integral equations. Eigenvalue problems. Special functions, including Bessel, Legendre and Tchebycheff functions. Asymptotic expansions.

605. Mathematical Logic (2-0; 2-0)
Sentential calculus; lower predicate calculus; Boolean algebra; structures; Goedel's completeness theorem.

610. Calculus of Finite Differences (3-0; 3-0)

Introduction to the properties of difference operators, with application to the solution of linear difference equations.

615. Integral Equations (3-0; 3-0)

Linear integral equations. Applications of general theory to the equations of Abel, Fredholm and Voleterra.

616. Topics in Functional Analysis (3-0; 3-0)

Selected chapters from the theory of linear spaces and operators, harmonic analysis, spectral theory and applications. The content may vary from time to time.

Prerequisite: Mathematics 500 or 501 and consent of department.

620. Advanced Complex Analysis (3-0; 3-0)

Geometrical aspects of the theory of functions of a complex variable. Conformal mapping. Riemann surfaces. Representation of analytic functions. Problems of convergence. (Topics may vary from year to year.)

Prerequisite: Mathematics 500 or equivalent.

621. Ordinary Differential Equations (Advanced) (3-0; 3-0)

Existence and uniqueness theorems; dependence of solutions on parameters and on initial conditions. Linear differential equations. Linear systems with isolated singularities of the first and second kind. Asymptotic behavior of nonlinear systems; stability.

Prerequisite: Mathematics 421 or equivalent.

625. Analytical Number Theory (3-0; 3-0)

Analytic theory of the distribution of primes. The Selberg - Erdös method. Distribution of power residues. Analytic methods in combinatorial problems and in additive number theory.

Prerequisite: Mathematics 515.

630. Topology (3-0; 3-0)

Combinatorial topology of surfaces; mapping and fixed point theorems; covering spaces; homology theory and Betti-groups; connectivity.

645. Lattice Theory (3-0; 3-0)

Partially ordered sets, lattices and complete lattices. Graphs of finite lattices. Distributive and modular lattices. Complemented lattices. Boolean rings. Generalized projective geometry and continuous geometry.

Prerequisite: Mathematics 425 or equivalent, and consent of department.

670. Topics in Algebra

Prerequisite: Consent of department.

671. Topics in Analysis

Prerequisite: Consent of department.

672. Topics in Geometry
Prerequisite: Consent of department.

673. Topics in Applied Mathematics
Prerequisite: Consent of department.

680. Advanced Quantum Mechanics (3-0; 3-0)

682. Advanced Electromagnetic Theory (3-0; 3-0)

685. Advanced Statistical Mechanics (3-0; 3-0)

688. Advanced Solid State Theory (3-0; 3-0)

690. Advanced Field Theory (3-0; 3-0)

692. Applications of Group Theory (3-0; 3-0)

695. Advanced Relativity Theory (3-0; 3-0)

697. Nuclear Structure (3-0; 3-0)

699. Selected Topics in Theoretical Physics (2-0; 2-0)

MICROBIOLOGY

Professor—G. E. Myers (Head)
Associate Professor—J. N. Campbell
Assistant Professor—T. Yamamoto

In this department, emphasis is placed upon the study of virology and bacteriology, other than medical bacteriology.

Honors in Microbiology

First Year
Biology 130 or 230, Chemistry 230, Mathematics 201, Physics 200, English 200 or 210, Physical Education.

Second Year
Microbiology 360, option (Biology 230 if not previously taken), Chemistry 350, option or Plant Science 455, a language course (German 210 or Russian 210 or French 200 recommended).

Third Year
Microbiology 401, Chemistry 370, Biochemistry 300, Genetics 351, an Arts option.

Fourth Year
Microbiology 402, Genetics 530, Microbiology 503*, an Arts option, an option.

---

*During the fourth year each candidate for the Honors degree will be required to conduct a directed studies problem under the supervision of a faculty member. The problem will, if possible, be related to the special field of interest of the student and will involve investigation of current literature and some experimental work on the part of the student. The student will be required to submit a written report of the investigation for approval by the supervising faculty member and to make a brief oral presentation of his findings to staff and students of the Department.

Advice to General Program Students

Students considering microbiology as a possible subject of concentration are advised that Microbiology 360 serves as an introduction to courses in microbiology given in this and other departments.

201. Elementary Bacteriology (3-3; 0-0)

Simple general bacteriology; the importance of bacteria in everyday life. Demonstrations and practical laboratory exercises.

360. Microbiology (3-3; 3-3)

A course in general microbiology including classification, physiology and metabolism, serving as an introduction to the practical application of this knowledge to industrial processes, specific fields of animal and plant biology and public health. The laboratory course illustrates the basic methods of studying micro-organisms and their products, and introduces the principles of the application of this knowledge.

Prerequisites: A University course in Chemistry and Biology 230 or consent of Department.

Textbook: Stanier, Doudoroff, Adelberg, *The Microbial World,* or Pelczar, Reid, *Microbiology.*

361. Pathogenic Bacteriology (3-3; 3-3)

The relation of bacteria, viruses, fungi and protozoa to disease. The isolation and identification of bacteria pathogenic to man. A study of bacterial infections and of resistance and immunity. Some consideration will be given to comparative bacteriology.

Prerequisite: Microbiology 360 or Bacteriology 201.

401. Immunology (3-0; 3-0)

A lecture course dealing with fundamental principles of immunology and serology and their applications in the various fields of microbiology.

Prerequisite: Microbiology 360 (or equivalent).

402. Microbial Physiology and Biochemistry (3-3; 3-3)

The lecture course deals initially with the chemical make-up of the bacterial cell and proceeds to a discussion of the catabolic and anabolic mechanisms found in micro-organisms. Various oxidative and fermentative systems will be discussed. The metabolism of organic and inorganic nitrogenous compounds, other specific systems, energy relationships and some of the enzymic processes will be presented.

The laboratory consists of projects assigned to small groups of students and designed to provide experience in the use of some of the equipment and techniques commonly employed in the studies of microbial metabolism.

Prerequisites: Microbiology 360, Biochemistry 300 (or its equivalent).

403. Microbial Taxonomy (3-0; 0-0) or (0-0; 3-0)

A study of the history, principles and methods of microbial classification and nomenclature.

Prerequisite: Microbiology 360 or Botany 360 or Botany 330 or 340, or consent of department.

404. Virology (3-3; 3-3)

A course in general virology including the classification and physical properties of bacterial, plant and animal viruses, and the technical methods used to study them. Various aspects of cell-virus relationships will be discussed. Consideration will be given to viral pathogenesis. Laboratory exercises will illustrate the methods for the propagation and assay of viruses including the use of embryonated eggs and tissue cultures.

Prerequisites: Microbiology 360 and Biochemistry 300, or consent of department.

465. Food Microbiology (3-3; 0-0)

This course is identical to Dairy Science 465.

The microbiology of the food and allied industries including sterilization and preservation (canning, freezing, radiation), food poisoning, food spoilage, the contamination of air and water, the disposal of domestic and industrial wastes.

Prerequisite: Microbiology 360 or permission of Department.

466. Dairy Microbiology (0-0; 3-3)

This course is identical to Dairy Science 466.

The bacteriology of the production and distribution of fluid milk and cream and consideration of some of the problems of the market milk industry. Milk supplies and public health. The bacteriological and biochemical aspects of pasteurization. The bacteriology of butter, cheese, ice cream and other milk products.

Prerequisite: Microbiology 360 or permission of Department.

467. Advanced Industrial and Food Microbiology (0-3; 0-3)

This course is identical to Dairy Science 467.

A laboratory lecture course covering some advanced techniques in microbiology including small scale industial fermentations, and the principles underlying the hygienic production of foods and dairy products and methods for the detection of faults in the various processing plants.

Prerequisites: Dairy Science 465 and 466, or permission of the Department.

468. Industrial Microbiology (3-0; 3-0)

This course is identical to Dairy Science 468.

The utilization of micro-organisms in the production of alcoholic beverages, industrial solvents, organic acids, antibiotics, fats, vitamins; the biological utilization of wastes; micro-organisms as a source of food materials; microbial preservation of foods.

Prerequisites: Plant Physiology and Biochemistry 431 and 432 or Biochemistry 300 and Microbiology 360 or Dairy Science 465 or 466, or permission of the Department.

Graduate Courses—

501. Microbiology

A general reading course. Students will be provided with a list of books, reprints, and references to important articles and suggestions on the selection

of current literature. They will be required to submit abstracts or reviews of this material and to satisfy the department on their knowledge of it. Credit to a maximum of six hours.

503. Microbiology
A directed studies program involving specialized reading and supervised experiments, with the presentation of written and oral reports at the end of the course.

505. Current Problems in Microbial Physiology (3-0; 3-0)
A lecture and seminar course on topics of current interest, with reading of original literature.

506. Current Problems in Immunology and Virology (3-0; 3-0)
A lecture course on current problems and their implications as fundamental research tools.

507. Advanced Microbiology Seminars (1S-0; 1S-0)
Organised preparation and presentation of two formal seminars on topics other than the thesis subject.

PHYSICAL SCIENCE

Instruction offered by members of the Department of Physics.

341. Physical Science (3-0; 3-0)
A course designed for B.A. and B.Ed. students to give them some appreciation of fundamental ideas and methods in the physical sciences, of modern trends in this field, and of its relation to other disciplines. Illustrative material will be taken from Physics, Chemistry, Astronomy and Geology, and the history and development of the subject will be stressed.
Textbook: Krauskopf and Beiser, *The Physical Universe*. Reading from a list of semi-popular books on science will also be required.

NOTES: 1. This course may not be used for credit towards the B.Sc. degree.
2. This course is not open to first year students, and may not be taken for credit by students who have credit in Physics 100 or 200.

PHYSICS

Professors—A. B. Bhatio, J. Hospers, K. B. Newbound, H. Schiff (Chairman), D. B. Scott

Associate Professors—S. N. Bagchi (Visiting Professor), D. D. Betts, G. L. Cumming, W. K. Dawson, F. D. Manchester, G. C. Neilson, B. V. Paranjape, J. T. Sample, H. W. Taylor, K. Vozoff, F. L. Weichman, S. B. Woods

Assistant Professors—J. P. Franck, E. R. Kanasewich, H. R. Krouse, W. C. Olsen, M. Razavy, S. S. Sheinin

Instructor—G. R. Small

Honors in Physics*

First Year

Physics 244, Mathematics 206, Mathematics 271, English 200 or 210, approved option, Physical Education.

First-year Engineering or the first year in the General Program may be accepted in consultation with the department.

Second Year

Physics 350, Physics 370, Physics 380, Mathematics 306, Mathematics 308, Arts option (Russian 210 or German 210 recommended, but any other may be substituted, especially for students who took Chemistry or Geology in First Year, and who may be in danger of failing honors).

Third Year

Physics 440; Physics 474; Physics 480; Mathematics 320; Mathematics 430 or an equivalent course, Mathematics 421 and 422.

Fourth Year

Physics 510; Physics 550; Physics 570; Physics 568 laboratory; three of Mathematics 426, Physics 516, Physics 520, Physics 540, Physics 572. Other options in the Fourth year can be arranged in special cases.

Students are also expected to take part in the weekly Physics Colloquium.

---

*NOTE: The B.Sc. in Engineering Physics—Students interested in the B.Sc. degree in Engineering Physics should consult with the Dean of the Faculty of Engineering.

Honors in Physics and Geology

This program is designed to prepare students for graduate work in either Physics or Geology, or for careers in Geophysics. By arrangement with the deparments concerned, a student may select from a wide range of courses in Geology or Physics, depending on his interests. The following typical program contains a large geological emphasis. Particular programs may include relatively greater amounts of Physics.

First Year

Physics 244; Geology 201; Mathematics 206; English 200 or 210; Chemistry 230; Physical Education.

Second Year

Physics 380, Geology 303 and 304; Mathematics 271; Chemistry 370; Language.

Third Year

Physcis 370; Geology 306, 401, 402 and 404; Mathematics 308 and 320; Arts option.

Fourth Year

Physics 474, 468 and 420 or 520; Geology 403, 405, 406, 409 and 464; one of Geology 461, 462, 465; a comprehensive examination.

Advice to General Program Students

1. The Department of Physics offers four alternative junior courses, which differ in prerequisites, detailed content and intended sequel.

Physics 100 is a general survey intended for students who lack credit in Grade XII Physics.

Physics 200 is a terminal course covering the general field, with Grade XII Physics as a prerequisite. It may also be used as the prerequisite for Physics 400 or Astronomy 410 for students who wish to pursue modern topics somewhat further, provided that Mathematics 201 is taken collaterally.

Physics 240 is intended as the first course of a sequence. It is incomplete unless followed by Physics 340, for these two courses cover the general field in a two-year sequence, which can then be followed by more specialized courses in the third year. Physics 30 or Physics 100 and Mathematics 30 and 31 are prerequisite; Mathematics 201 is corequisite.

Physics 244 is designed for students who are contemplating honors in Physics, Physics and Geology, or Mathematics. It is restricted to students who are recommended as qualified for honors on the basis of their matriculation standing.

2. Credit cannot be given towards a degree for both Physics 100 and 200, or for more than one of Physics 200, 240 or 244.

3. For students taking more than one physics course, in the General Program, the following sequences are recommended:

Two course sequence: Physics 200 and 400; or Physics 240 and 340.

Three course sequence: Physics 240, 340 and 400.

Four or five course sequence: Physics 240 and 340; two or three of Physics 400, 405, 420, 440 or Astronomy 410. Mathematics 304 is advisable in the second year.

100. Introductory General Physics (3-3; 3-3)

Introduction to the experimental phenomena and theoretical ideas of physics. This course may be taken as a substitute for Grade XII physics, provided no further courses in physics are desired, but is given from a more advanced point of view with added reference to current developments.

200. Basic General Physics (3-3; 3-3)

The mechanical, thermal, electromagnetic and optical properties of matter; the forms and transformations of energy; introduction to the atomic theories of modern physics.

(For a continuation, see Physics 400).

Prerequisites: Physics 30, Mathematics 30.

240. Physical Properties of Matter, Heat and Sound (3-3; 3-3)

Mechanics, properties of matter, heat, light, wave-motion and sound. Illustrated by experiments.

Prerequisites: Physics 30, Mathematics 30 and 31.

Corequisite: Mathematics 201 or 207 (Students who lack Mathematics 31 must also take Mathematics 101).

244. Mechanics, Electricity and Magnetism (3-3; 3-3)

Kinematics, Particle and rigid dynamics, translational, rotational and orbital motion. Lines of force, work and energy. Equilibrium. Simple periodic motion. Dissipative forces, molecular and atomic motions leading to ideas of temperature and heat.

Electrostatics, field and potential, capacitance, dielectrics. Current, sources

of EMF, DC currents, Kirchhoff's laws. Magnetic field of a current, force on a current, dipoles, magnetic properties of materials, ferromagnetism. Induction, self and mutual inductance, energy of magnetic field.

Prerequisites: Physics 30, Mathematics 30 and 31.
Corequisite: Mathematics 206.

340. Light, Electricity and Magnetism (3-3; 3-3)

A course designed to follow Physics 240 and to give a foundation in physics suitable for work in other physical sciences. Interference, diffraction and polarization of light. Electrostatics, potential, capacitors, D.C. circuits, magnetism and magnetic field, electromagnetism, induced E.M.F., self-inductance, introduction to alternating currents. Elementary atomic and nuclear physics.

Prerequisites: Physics 240, Mathematics 200 or 201 or 202 or 207.

350. Heat and Thermodynamics (0-0; 3-0)

Properties of gases, specific and latent heats, thermodynamic equilibrium, ideal and real gases, change of phase, general state functions, entropy, laws of thermodynamics, heat transfer.
Prerequisites: Physics 244 and Mathematics 206.

370. Mechanics, Properties of Matter, Wave Motion, and Optical Phenomena (3-1s-3; 3-1s-3)

Conservation laws, cenral force motion, Rutherford-Bohr atom, kinetic theory of gases, electrical and mechanical oscillations, linear wave motion, elasticity, fluid flow, laws of propagation of light, interference, diffraction and polarization. Laboratory will also include some experiments on heat.
Prerequisite: Physics 244 and Mathematics 206.
Corequisite: Mathematics 306.

380. Electromagnetism and Modern Physics (3-3; 3-3)

Electrostatics; field and potential theory; DC circuits and instruments; properties of dielectrics and capacitance; inductance; magnetic properties of matter; electromagnetic waves. Interaction of electromagnetic waves and matter, wave aspects of matter.
Prerequisite: Physics 244 and Mathematics 206.
Corequisite: Mathematics 306.

400. The Development of Modern Physics (3-3; 3-3)

A study of modern physics, emphasizing the development of current theoretical concepts and modern experimental methods. Topics will include: kinetic theory of matter; electrical conduction, electrons and electron tubes; electrical and neutral particles; radiation and quantum theory; radio-activity and nuclear atomic energy; cosmic rays; relativity.
Prerequisites: Physics 200 or 240 and 340, or 240 and 380; Mathematics 200 or 201.

405. Introduction to Theoretical Meteorology (3L-0; 3L-0)

This course is identical to Geography 405.

A study of the physics of the atmosphere, including thermodynamics, stability, equations of motion, friction and turbulence, mechanics and structure of cyclones and anticyclones.
Prerequisites: Mathematics 201, Physics 240.

420. Introduction to Earth Physics (3-3; 3-3)

A course designed to introduce physical methods of studying the solid earth. Elastic waves and gravitation. Physical properties of the earth as indicated by earthquake waves, gravity, paleomagnetic and magnetic and electrical measurements. Principles of geophysical exploration methods. Heat flow in the earth's crust, radio-activity of rocks.
Prerequisite: Physics 340.

440. Electronics (3-3; 3-3)

Theory and use of electron tubes and solid state devices, including four-terminal active and passive networks; equivalent circuits; resonant and coupled circuits; filters; amplifiers and oscillators; non-linear circuits; digital and analog circuits.
Prerequisites: Physics 340 or 380, Mathematics 304 or 306.

468. Advanced Laboratory (0-3; 0-3)

Methods in experimental atomic physics and spectroscopy.
Corequisite: Physics 474.

474. Relativity and Introduction to Wave Mechanics (1-0; 3-0)

Special relativity, wave mechanics; introduction to Schrodinger equation; solutions for plane waves, hydrogen-like atom, periodic fields; introduction to perturbation methods; vector model of the atom.
Prerequisite: Physics 380.
Prerequisite or corequisite: Mathematics 420, or 421 and 422.

480. Electromagnetism (3-3; 3-3)

Potential theory; description of electromagnetic field using vector methods; Maxwell's equations; electromagnetic waves in continuous media and in guides; selected topics in electromagnetism.
Prerequisites: Physics 340 or 380.
Prerequisite or corequisite: Mathematics 420, or 421 and 422.

Honor and Graduate Courses—

510. Thermodynamics and Kinetic Theory (3-0; 3-0)

Principles of thermodynamics with physical applications, kinetic theory, transport phenomena, Boltzman, Fermi-Dirac and Bose-Einstein statistics, thermodynamics of irreversible processes.
Prerequisites: Physics 340 or 380, Mathematics 304 or 420, or 421 and 422.

516. Solid State Physics (2-0; 2-0)

An introduction to the theory of solids, including a study of the properties of metals, semiconductors and dielectrics.
Corequisite: Physics 570.

520. Geophysics (3-3; 3-3)

Physical structure of the earth. Earthquake and explosion seismology, gravity, heat flow and age determination, tectonophysics. Geomagnetic, paleomagnetic and electromagnetic methods in the study of the earth. Methods of geophysical exploration.
Prerequisites: Mathematics 404 or 421 and 422.
Prerequisite or corequisite: Physics 480.

540. Advanced Electronics (2-0; 2-0)

Application of complex variable, Fourier series and Laplace transform to the analysis of electronic circuits with linear and non-linear elements.
Prerequisites: Mathematics 420 or 421 and 422; Physics 440.

550. Mathematical Physics (2-1; 2-1s)

This course is intended as an introduction to the principal mathematical methods of dealing with the scalar and vector fields of Physics. Topics include the Sturm-Liouville theory of eigenvalue problems, matrices, partial differential equations, operational methods and Laplace transforms, Fourier transforms, Green's functions, integral equations and the non-linear equations of hydrodynamics.
One hour per week will be spent on class discussion of problems.
Prerequisites: Physics 480, Mathematics 420, or 421 and 422.

560. Physical Optics (3-0; 3-0)

The wave theory of the propagation of light in free space and in transparent media; classical electromagnetic theory of absorption, dispersion and scattering; introduction to spectroscopy.
Prerequisites: Physics 360 and 480, Mathematics 420, or 421 and 422.

568. Advanced Laboratory (0-4; 0-4) or (0-7; 0-7)

Methods in experimental atomic physics, spectroscopy and nuclear physics, introduction to modern laboratory techniques. The number of hours required and the experiments assigned depend upon the student's complete fourth year program.
(Restricted to honors students in Science, and Engineering Physics.)
Prerequisites: Physics 470 and Physics 440 or equivalent.

570. Relativity and Quantum Mechanics (3-0; 3-0)

Special theory of relativity. Introduction to quantum mechanics with application to atomic and modern physics.
Prerequisites: Physics 480, Mathematics 420 or 421 and 422.

572. Nuclear Physics (2-0; 2-0)

Introductory survey of modern experimental and theoretical nuclear physics.
Corequisite: Physics 570.

574. Radiation Physics (3-0; 3-0)

X-rays and radioactivity, with emphasis on their biological effects and medical uses. Production, properties and uses of radioactive isotopes.
Prerequisite: Physics 470 or approval of Department.

601. Seminars in Advanced Topics (0-1s; 0-1s)
Weekly research seminars are held in Theoretical Physics, Nuclear Physics and Low Temperature Physics.

616. Low Temperature Physics (2-0; 2-0)

620. Advanced Problems in Geophysical Exploration (2-0; 2-0)

622. Advanced Earth Physics (2-0; 2-0)

660. Atomic Theory and Spectroscopy (2-0; 2-0)

662. Molecular Spectroscopy (3-0; 3-0)

672. Advanced Nuclear Physics (3-0; 3-0)

680. Advanced Quantum Mechanics (3-0; 3-0)

682. Advanced Electromagnetic Theory (3-0; 3-0)

685. Advanced Statistical Mechanics (3-0; 3-0)

688. Advanced Solid State Theory (3-0; 3-0)

690. Advanced Field Theory (3-0; 3-0)

692. Applications of Group Theory (3-0; 3-0)

695. Advanced Relativity Theory (3-0; 3-0)

697. Nuclear Structure (3-0; 3-0)

699. Selected Topics in Theoretical Physics (2-0; 2-0)

PHYSIOLOGY

Instruction offered by members of the Department of Physiology, Faculty of Medicine.

Honors in Physiology

The honors program is designed primarily to prepare students for advanced study and research leading to academic and research careers. The secondary purpose is to provide students with a specialized knowledge, both theoretical and practical, to prepare them for positions as research assistants in government, hospital and industrial laboratories. The emphasis has been placed on depth rather than breadth. Consideration will be given, in choice of options and reading material, to students with interest in a particular branch of Physiology or in Pharmacology.

First Year

Chemistry 230, Physics 100, 200 or 240, Zoology 220, Mathematics 200 or 201, English 200 or 210, Physical Education.

Second Year

Chemistry 350, Chemistry 370, Physiology 361, Zoology 300, a modern language (German 210 or Russian 210 suggested).

Third Year

Physiology 463, Biochemistry 300, Physiology 504 or Physiology 505, Physiology 600 (Seminar), one Arts option, one approved science option.

Fourth Year

One of Physiology 501, 502, 503, 507 or Pharmacology 504; an approved honors or graduate course in Biochemistry; Physiology 504 or Physiology 505 (whichever was not taken in the Third Year); Physiology 506; Physiology 600; Biometrics 455; one approved science option (Bacteriology 360, Botany 320 and Pharmacology 421 recommended).

A reading knowledge of French, German or Russian is recommended.

A comprehensive oral examination may be required at the termination of the prescribed course.

360. Elementary Human Physiology (3-0; 3-0)

This course comprises the essentials of human physiology.

For students of Household Economics.

Prerequisites: Zoology 220, Chemistry 350.

Textbook: Winton and Bayliss, *Human Physiology*.

361. Elementary Human Physiology (3-2;-3-2)

This course comprises the essentials of human physiology, and the laboratory program is designed to illustrate principles of animal function. This course will normally be taken by students in the Faculties of Pharmacy and Physical Education but may also be taken by students in other Faculties. Credit must be obtained for laboratory work to allow a passing grade for the course.

Prerequisites: Zoology 220 or 225; Chemistry 250 or 350.

Textbooks: Winton and Bayliss, *Human Physiology;* Bell, Davidson and Scarborough, *Textbook of Physiology and Biochemistry,* 5th ed. The latter textbook is strongly recommended for those students proceeding to advanced courses in Physiology and to students registered in Honors programs.

362. Elementary Mammalian Physiology (3-3; 3-3)

This course will have the same lecture content as Physioology 361, but will have a separate laboratory program extending beyond the introductory level of exercises. * *

Offered to selected students in the Faculties of Arts, Science and Graduate Studies.

Prerequisites: Zoology 220; Chemistry 250 or 350.

Reference Texts: Fulton, *Physiology of the Nervous System;* Sherrington, *Integrative Action of the Nervous System;* Eccles, *The Neurophysiological Basis of Mind;* Eccles, *The Physiology of Nerve Cells;* Walsh, *Physiology of the Nervous System.*

400. Cell Physiology (3-0; 0-0)

An outline of the basic concepts of cellular function. Topics will include the structure and function of the cell membrane, mitochondria, nucleus and other subcellular particulates. Such processes as movement, irritability and division will also be considered.

Prerequisites: Zoology 220 and Chemistry 350 or equivalent.

401. Special Systemic Physiology (0-0; 3-3)
A one term course, designed to complement Physiology 400 (Cellular Physiology), which will deal up to intermediate level with selected mammalian organ physiology. The laboratory exercises will provide experience in more advanced physiological methods.
Prerequisites: Physics 200; Physiology 400 or 361 or Zoology 440.

462. Human Neurophysiology (0-0; 2-3)
A course in essential neurophysiological mechanisms involved in sensation, locomotion and integration of visceral function. The lectures, laboratory and clinical demonstrations will be part of the course for medical students.
Prerequisites: Physiology 261 or 361 or Zoology 440; Anatomy 415 (Neuroanatomy) is recommended as a co-requisite.

463. Human Physiology (4-3; 4-6)
A course designed for students in Honors programs in biological science, similar to Physiology 411, but less extensive in content. It includes a study of the circulatory, digestive and respiratory systems, and the phenomena of digestion, absorption, metabolism and excretion; a study of nerves and synapses, muscle, spinal reflex systems, brain centres and tracts, the special senses, the autonomic nervous system and aspects of behaviour (corresponding to Physiology 462) and a presentation of the principles of action of endocrine glands and detailed treatment of several of these glands. The course content is offered in lectures, demonstrations, laboratory exercises and tutorials. Clinical demonstrations are included.
Prerequisites: Zoology 220; Chemistry 370 or Zoology 300; Anatomy 415 and Physiology 400, or Zoology 440, recommended but not required.
Textbooks: Bell, Davidson and Scarborough, *Textbook of Physiology and Biochemistry,* 5th ed.; Lovatt Evans, *Principles of Human Physiology,* 12th ed.; Ruch and Fulton, *Medical Physiology and Biophysics,* 18th ed.; Bard, *Medical Physiology,* 11th ed.
Reference texts: Davson, *Textbook of General Physiology;* Rushmer, *Cardiovascular Dynamics;* Eccles, *The Physiology of Nerve Cells;* Turner, *General Endocrinology,* 3rd ed.

Honor and Graduate Courses—

501. Cardiovascular Reflex Activity (0-0; 3-0)
Principles of electrophysiological recording from sensory nerves; classical and modern manometry of cardiovascular pressure pulses; nerve receptors in heart and great vessels; cardiovascular effector mechanisms, biophysics of blood vessels; pharmacology of agents acting on the cardiovascular system; measurement and reflex regulation of the cardiac output; hormonal and central nervous integration of cardiovascular reflexes.
Prerequisites: Physiology 361 and preferably Physiology 463 or 411 (Medical).

502. Methodology in Physiology (0-3; 0-3)
A theoretical and experimental problem in methodology related to a chosen physiological field will be arranged under staff supervision. The course will require library and laboratory investigation and a written report.
Prerequisites: Physiology 361 and preferably Physiology 463 or 411 (Medical).

503. Cellular Neurophysiology (0-0; 3-0)

Nature of nerve impulse; excitability of nerve; conduction in nerve; motor end plate; synaptic transmission; pacemakers; sensory receptors.

Prerequisites: Physiology 361 and Physiology 462.

504. The Physiology of the Adrenal Cortex and the Gonads (3-0; 0-0)

A review of the physiology of the vertebrate adrenal cortex including its relationship to the pituitary, a brief consideration of diseases of this gland in man, and of the estimation of its hormones in blood and urine. An introductory review of the physiology of reproduction in mammals and birds followed by detailed consideration of selected problems in endocrine physiology such as functions and control of secretion of prolactin, hormonal control of plumage in birds.

Prerequisites: Physiology 361 or 411 or 463 or Zoology 440; Biochemistry 300 desirable as a prerequisite or co-requisite.

505. Advanced Physiological Techniques (0-0; 1-6)

A laboratory course designed to give experience in the use of more elaborate techniques in longer experiments. The student will assemble and test the apparatus for techniques described in the literature; classical as well as modern procedures will be represented.

Prerequisites: Physiology 361 or Physiology 463 or 411 (Medical).

506. Tutorial and Reading Course Credit 4 hours

Comprises guided reading in selected topics followed by written and oral presentation of the material covered. Each student will be required to submit review type essays to be analyzed critically by a staff member and to be presented before the group. The course is designed to provide training in analysis, synthesis and communication of scientific material, as well as to allow accumulation of more advanced knowledge.

Prerequisites: Physiology 361 or Physiology 463 or 411 (Medical); at least one of Physiology 501, 503 or 504 or an equivalent course in another department.

507. The Physiology of Temperature Regulation (0-0; 3-0)

A course dealing with various aspects of thermal regulation in man and other homeotherms. The neural and hormonal mechanisms contributing to adjustments necessary to maintain thermal balance with variations in environmental demand are discussed. A major portion of the course is devoted to discussion of researches elucidating acclimatization of homeotherms to low temperature and of adaptation of species to inhabit arctic and subarctic environments.

Prerequisites: Physiology 361 or 411 or 463 or Zoology 440.

600. Seminar (1S-0; 1S-0)

Organized presentation and discussion of some aspect of human physiology, a different theme being chosen each year.

Prerequisites: Physiology 361 or Physiology 463 or 411 (Medical).

PLANT BIOCHEMISTRY

Instruction offered by members of the Departments of Botany and of Plant Science in the Faculty of Agriculture.

431. Plant Biochemistry and Physiology—Plant Biochemistry (3-3; 0-0)

An introduction to plant biochemistry, with consideration of the comparative aspects of biochemistry. Topics include intracellular structure, acidity and colloidal properties of protoplasm, chemistry and metabolism of carbohydrates, including respiration and photosynthesis.

Prerequisites: Chemistry 230 and Chemistry 250 or 350, or consent of the department.

432. Plant Biochemistry and Physiology—Plant Biochemistry (0-0; 3-3)

A continuation of Plant Biochemistry 431, this course deals with the biochemistry of lipids and related plant constituents, and the chemistry and metabolism of nitrogen-containing compounds.

Prerequisite: Plant Biochemistry 431.

551. Advanced Plant Biochemistry (3-0; 0-0)or(0-0; 3-0)

This course is identical to Plant Science 551 and to Botany 551.

Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and methods of investigation in these fields.

Prerequisites: Biochemistry 300 or Plant Physiology and Biochemistry 432 or consent of departments.

PSYCHOLOGY*

Professors—J. R. Royce (Head), D. E. Smith, L. von Bertalanffy

Associate Professors—A. J. B. Hough, E. Howarth, T. M. Nelson, P. O. Rempel, W. W. Rozeboom, W. H. Runquist, W. A. S. Smith, D. Spearman, Lolita Wilson

Assistant Professors—W. Blanchard, B. Rule, S. J. Rule, R. E. Walley, T. Weckowicz

Research Associate—A. B. Carran

Honors in Psychology

The department offers both the B.A. and B.Sc. degrees with Honors in Psychology. Students wishing to emphasize the Humanities and Social Sciences in their programme should register for the B.A. Those who wish to emphasize the Physical and Biological Sciences should register for the B.Sc.

Honors in Psychology will require six to ten courses in Psychology including the following: Psychology 202, 309; one Science course with lab., one Arts course; and the Honors Seminar 501. The Honors Seminar must be taken each year that the student is in residence in the Honors programme at this University, with the exception of the Freshman Year. A minimum of five courses will be taken in related subjects. The courses in related subjects might be all in one field (e.g., Mathematics or Biology) or in several, depending on the student's special interest and relevance to the subject matter of Psychology.

*See also Faculty of Arts Section of this Calendar.

In addition a minimum of five optional courses will be chosen; some of these will be integrated with the programme in Psychology while others must be general options

An important feature of the Honors programme includes the opportunity for the student to engage in independent study and research. During the fourth year the student in Psychology will write an Honors thesis under the guidance of a Member of the Department.

In addition to the regular course examinations, candidates for Honors will present their theses at a Departmental Seminar. Such presentations will comprise a major component of the Honors Seminar required of all students in the programme.

Advice to General Program Students

The Department of Psychology offers courses leading to both the B.A. and B.Sc. degrees. Students wishing to emphasize the Humanities and Social Sciences in their programs should register for the B.A. and follow one of the sequences suggested in the Faculty of Arts Calendar. Students wishing to emphasize the Biological Sciences should register for the B.Sc. and follow one of the following sequences:

Three course sequence: Psychology 202 and 309, Psychology 365 or 366 (half courses), and one other senior Psychology course listed in the Faculty of Arts calendar.

Four and five course sequence: Psychology 202, Psychology 309, Psychology 365 and 366 (half courses); one senior Psychology course listed in the Arts calendar; the remainder from senior Psychology listings in the calendar of either Faculty.

NOTE: Since Psychology 309 is prerequisite or corequisite for Psychology 365 and 366 it should be taken in the second year.

309. Statistical Methods for Psychological Research (3-3; 0-0)or(0-0; 3-3)

Application of statistical methods to psychological problems; description of psychological data in terms of averages, measures of variability, and measures of relationships; problems of sampling theory and tests of statistical hypotheses.

360. General Experimental Psychology (3-3; 0-0)or(0-0; 3-3)

A course designed for the arts concentration covering the application of experimental methods to a wide variety of psychological problems.

Prerequisite: Psychology 202.

Corequisite: Psychology 309.

365. Experimental Psychology: Learning (3-3; 0-0)or(0-0; 3-3)

A basic course covering acquisition, retention and utilization of learned behavior. Laboratory will illustrate methods of studying learning in animals and humans.

Prerequisite: Psychology 202.

Corequisite: Psychology 309.

366. Experimental Psychology: Perception (3-3; 0-0)

Basic facts of sensory and perceptual phenomena, with focus on vision and hearing.
Prerequisite: Psychology 202.
Corequisite: Psychology 309.

460. Experimental Psychology: Apparatus techniques (0-0; 0-3)

A laboratory course concerned with training and practical familiarization with commonly used experimental apparatus.

468. Motivation and Emotion (3-0; 0-0) or (0-0; 3-0)

The environmental and physiological activation of animal and human behaviour .
Prerequisite: Psychology 202.

474. Comparative Psychology (0-0; 3-2)

Principles of animal behavior with reference to phylogenetic differences.
Prerequisite: Psychology 202.

475. Physiological Psychology (3-2; 0-0)

Physiological correlates of animal and human behavior.
Prerequisite: Psychology 202, Physiology 361 or 362, or consent of department.

Honor and Graduate Courses—

Candidates for honors will arrange their courses in consultation with the head of the department.

501. Honors Seminar (3-0; 3-0)

A discussion of current topics in Psychology. Required of all students enrolled in Honors during their second, third, and fourth years.

504. Conference Course in Psychology (3-3; 0-0)

505. Conference Course in Psychology (0-0; 3-3)

528. Advanced Psychometric Theory (3-1; 3-1)

Principles of psychological measurement with stress on test theory, psychophysical measurement and scaling theory. Includes such topics as reliability, validity, item analysis, law of comparative judgment and unidimensional unfolding.
Prerequisite: Psychology 309 or consent of department.
Corequisite: Psychology 431.

503. Research Design I (3-1; 3-1)

531. Research Design II (3-1; 3-1)

A two year sequence required of all graduate students covering methodological techniques and conceptual problems in the design, execution and evaluation of psychological research. Includes formulation of hypotheses, selection of experimental conditions, analysis of variance designs, factor analysis.

560. Advanced Experimental Psychology (3-0; 3-0)

A comprehensive survey of fundamental psychological processes emphasizing both major theoretical issues and empirical findings, particularly in learning and perception. Required of all graduate students.

565. Seminar in Learning Theory (3-0; 0-0)or(0-0; 3-0)

Discussion of major theoretical and empirical issues in contemporary learning theory.

Prerequisite: Advanced standing in Psychology.

570. Drugs and Behaviour (3-0; 0-0)or(0-0; 3-0)

Review of the effects of stimulant, depressant, sympathetic, parasympathetic and ataractic drugs on human and animal behaviour.

Prerequisite: Psychology 489, and Psychology 475 or a course in Neuropsychology.

575. Advanced Physiological Psychology (3-3; 3-3)

An intensive survey of methods and problems in Physiological Psychology.
Prerequisite: Physiology 462 or consent of department.

578. Experimental Psychopathology (3-3; 0-0)or(0-0; 3-3)

A review of animal and human experimental studies of psychopathology. The course will include studies dealing with the scientific validation of psychoanalytic theory, perceptual studies of psychiatric patients, and experimental attempts to relate psychotherapy and learning theory.
Prerequisite: Psychology 489 and one course in experimental psychology, or consent of the department.

585. Seminar in Theories of Perception (3-0; 0-0)or(0-0; 3-0)

A theoretical coverage of major issues: classical theories, field theory, sensory-tonic, adaptation level, frame of reference, probabalistic and transactional functionalism, directive state, event-structure, cybernetics and the system viewpoint.
Prerequisite: Psychology 366.

599. Honors Thesis (3-3; 3-3)

Students in their fourth year of honors will pursue a research project under the direction of a member of the department.

600. Research Seminar (2s-0; 2s-0)

Reports by students and staff on current research in the department. Required each year of all graduate students in the Department of Psychology and for fourth year honors students.

648. Research (3-3; 0-0)

649. Research (0-0; 3-3)

698. Advanced Research (3-3; 0-0)

699. Advanced Research (0-0; 3-3)

STATISTICS

Instruction offered by members of the Departments of Mathematics and Computing Science.

255. Elementary Statistics (3-3; 3-3)
Graphs, tables, diagrams. Frequency distributions, averages, dispersion, moments. Elementary probability. Binomial, normal and Poisson distributions. Sampling. Regression and correlation. Significance tests. Applications to data in various fields.
Prerequisite: Mathematics 30.

256. Numerical Mathematics. Statistics and Probability (3-2; 3-2)
Fixed-point and significant digit arithmetic. Round-off error differences of data and of elementary tabular functions. Use of mathematical tables. Difference and summation operators. Factorial polynomials. Fitting of equispaced data. Difference approximation to differential and integral operators. Simultaneous linear equations and method of solution. Matrices. Set theory of events. Probability measure. Finite Markov chains. Relative frequencies and probability. The binomial and Poisson distributions. The normal distribution. Elements of statistical inference.
Prerequisite: Mathematics 30 and 31.
NOTE: This course is required of first year Honors students in Mathematics. Other students admitted only with the consent of department.

305. Introductory Statistics (3-0; 0-0) or (0-0; 3-3)
Tabulation, graphical representation and reduction of data. Measures of location and dispersion. Elementary probability. Binomial and normal distributions. Curve fitting and the chi-square test of goodness-of-fit. Elements of sampling. Testing statistical hypotheses, confidence intervals.
Prerequisite: Mathematics 30.

450. Probability and Statistics (3-0; 3-0)
Theory of probability. Distribution functions and characteristic functions. Central Limit theorem. Sampling. Exact sampling distribution. Confidence intervals. Maximum likelihood. Methods of least squares. Analysis of variance. Statistical inference.
Prerequisites: Mathematics 304 and preferably Mathematics 255, or equivalent.

455. Introduction to Mathematical Statistics (3-0; 3-0)
Fundamental probability set, algebra of events. Dependence and independence. Random variables and probability distributions. Foundations of Statistical Inference.
Prerequisite: Mathematics 306 and Statistics 256. (With the consent of the department, Statistics 256 may be waived or Mathematics 360 replaced by Mathematics 304.)

560. Estimation and Statistical Hypotheses (3-0; 3-0)
Cramér - Rao inequality; Bhattacharya bounds; sufficiency and completeness; minimax and Bayes estimates based on order statistics.
Neyman - Pearson theory; similar regions; least-favorable distributions; principle of invariance; unbiased tests; non-parametric theory.

562. Theory of Games (2-0; 2-0)

Games in normal and extensive form. Methods of solution. Statistical games. Minimax strategies. Bayes procedures. Linear programming.

564. Analysis of Variance (3-0; 3-0)

Point estimation. Confidence ellipsoids and tests under normal theory. The one-way layout. Multiple comparisons: the complete two-, three- and higher-way layouts. Partitioning of a sum of squares. Latin squares. Incomplete blocks and nested designs. The analysis of covariance. Random effects models.

565. Mathematical Methods of Statistics (2-0; 3-0)

Foundations. Axioms of a probability space. Dependence and independence. Random variables and probability distributions. Characteristic functions. First and second Central limit Theorems. Exact sampling distributions. Regression and correlation. Elements of statistical inference.

570. Probability Theory and Applications (2-0; 2-0)

Limit theorems for random variables. Random walks and recurrent events. Applications to Markov chains and selected statistical problems.

660. Stochastic Processes (2-0; 2-0)

674. Topics in Statistics
Prerequisite: Consent of department.

ZOOLOGY

Professors—D. M. Ross (Head), L. von Bertalanffy, J. R. Nursall
Associate Professors—W. A. L. Fuller, C. P. Hickman, Jr., J. C. Holmes, V. Lewin, G. O. Mackie, R. F. Ruth
Assisant Professors—S. A. Altmann, D. D. Beatty, D. A. Boag
Honorary Research Associate—J. Dewey Soper

Honors in Zoology

A general program student with a three or four course concentration in zoology can undertake graduate work only by spending a year as a special student after taking a B.Sc. A five course concentration with suitable ancillary subjects might be sufficient background for graduate work. If an undergraduate in the General Program forms a desire to do graduate work in zoology he should consult the Department for advice on the best combination of courses in the final years of his General degree program.

The Honors program provides a comprehensive training in Zoology leading to higher degrees and a research or academic career. It requires a minimum of eight courses in Zoology, two of which are half-year, field-oriented courses. Certain ancillary subjects are required and other ancillary subjects may be taken as "approved options". Students are required to take the Zoology field course (Zoology 525) in the third and fourth years, to attend the Zoology Seminar (Zoology 520) in the fourth year and to undergo a comprehensive oral examination on basic biological facts and principles at the end of the fourth year. Honors students are often employed on biological work during the summers.

First Year

English 200 or 210; Biology 130 or 230*; Arts option (modern language of matriculation recommended); Chemistry 130 or 230; Physics 100 or 200; Physical Education.

Second Year

Zoology 300 and 350; Arts option; Chemistry 350; Genetics 351.

Third and Fourth Years

Five senior courses in Zoology, including Zoology 411, 440, 481 and two of Zoology 406, 408, 452, 462, 464, 465 and 471; four approved options; one open option.

---

*Students without Biology 30 are required to take Biology 130; students with Biology 30 may proceed to more advanced courses with consent of department.

Honors in Geology and Zoology

See under Department of Geology

Junior Courses—

(See also courses listed under Biology.)

221. Elementary Zoology (2-3; 2-3)

Zoology for pre-dental students.

Senior Courses—

300. The Chordates (3-3; 3-3)

A comparative review of the chordates, with dissections of available types from all classes.

Prerequisite: Zoology 220.

320. Vertebrate Biology (2-4; 2-4)

A general survey of structure and functions of vertebrate animals.

Prerequisiet: Zoology 220.

321. Animal Geography (0-0; 3-0)

An outline of the distribution of the major groups of animals in time and space, together with a presentation of ecological and geological theories to explain the observed distributions.

Normally to be taken in sequence with Botany 321. Not open to honors students in Zoology.

Prerequisites: Any two of Botany 201, Geography 201 or Zoology 220, or consent of instructor.

350. The Invertebrates (3-3; 3-3)

A survey of the invertebrates with emphasis on functional anatomy.

Prerequisite: Zoology 220.

406. Ornithology (0-0; 3-3)

Origin, distribution, anatomy, taxonomy, behavior and ecology of the birds of the world, with emphasis on the birds of Alberta.

Prerequisite: Zoology 300.

408. Mammalogy (3-3; 0-0)

Origin, relationships and structure of mammals. A survey of the families of living mammals; past and present distribution of important groups; recognition and life histories of Alberta forms.

Prerequisite: Zoology 300.

411. Embryology (3-3; 0-0)

The sequence of normal development is presented and the underlying mechanisms are analysed.

Prerequisite: Zoology 300 or consent of instructor.

412. Experimental Embryology (0-0; 3-3)

The classical and modern experiments which have made embroyology an experimental subject are presented and some of them are tested.

Prerequisite: Zoology 411 or consent of instructor.

440. Comparative Animal Physiology (3-3; 3-3)

Organization and diversity of animal functions; nervous and endocrine integration; metabolism; reproduction, growth and metamorphosis.

Prerequisite: Zoology 300; 350 and Chemistry 250 or 350. Zoology 350 may be taken as a corequisite with the instructor's permission.

452. Principles of Parasitism (0-0; 3-3)

Host and parasite adaptations; relationships with other forms of symbiosis; effects of parasitism on the host and the parasite; parasitism and disease.

Prerequisite: Zoology 350, 462. Zoology 350 may be taken as a corequisite with the instructor's permission.

462. General Ecology (3-3; 0-0)

The principles governing the relationship of animals to their environments and to one another.

Prerequisite: Two courses in Zoology.

464. Limnology (0-0; 3-3)

Physical and chemical characteristics of lakes; qualitative and quantitative techniques for determination of planktonic, benthic and fish production; principles of lake management.

Prerequisites: Zoology 300, 350.

465. Boreal Ecology (0-0; 3-3)

A study of the animals of the cold temperate, subarctic and arctic regions and in the adaptations that enable them to survive in those regions.

Prerequisite: Zoology 462.

471. Animal Behavior (3-0; 0-0)

Behavior as an adaptive phenomenon. The genetic, anatomical, neurological and hormonal bases of behavior. The structure of animal societies. The systematic, ecologic and evolutionary significance of behavior.

Prerequisite or Corequisite: Zoology 300, or consent of Department.

481. Practical Histology (0-0; 3-3)

Principles and practice of microscopy, tissue preparation techniques, micrometry and photomicrography. Principles of biological structure. Study of tissues.
Prerequisites: Zoology 300 and 350, Chemistry 250 or 350.

Honor and Graduate Courses—

515. Introduction to Mathematical Biology (3-0; 3-0)

Fundamentals of logic, sets, combinations and permutations, probability, vectors, matrices and stochastics; restricted to finite, discrete cases. Mathematical models of various biological phenomena such as genetic coding, nerve nets, social organization, kinship relations, fertility and so forth.
Prerequisite: Zoology 220 or consent of instructor.
Not ordinarily open for credit to students who have taken Math 270.

520. Seminar in Zoology (1s-0; 1s-0)

Reports by members of staff, graduate students and invited speakers, on research in progress or on recent advances in Zoology. Required of all fourth year honors and graduate students.

521. Mechanisms of Evolution (0-0; 3-0)

Selected topics dealing chiefly with current concepts of organic evolution.
Prerequisites: Zoology 300; 350; Genetics 351.
(Not offered in 1964-65)

525. Field Course in Zoology

A survey of the terrestrial and freshwater fauna of Alberta alternates yearly with a survey of the marine and littoral fauna of part of the Pacific coast. The course lasts two weeks and follows the spring examination. Both parts are required for the Honors B.Sc. in Zoology and should be taken in the third and fourth years.

529. Special Problems in Zoology (3 hours either or both terms)

540. Environmental Physiology (1-5; 1-5)

A special topics course designed for the study of physiological adjustment of animals to the effect of environmental variables.
Prerequisites: Zoology 300; 350; Zoology 440 or Physiology 361.

555. Wildlife Parasitology (3-3; 0-0)

Morphology, life cycles, pathology and control of animal parasites of fish, birds and mammals, with special reference to forms found in Alberta game.
Prerequisite: Zoology 462 or consent of Department.

556. Helminthology (1-5; 1-5)

Taxonomy, morphology and ecology of the parasitic helminths.
Prerequisite: Zoology 452 or consent of department.
(Not offered in 1964-65)

562. Conservation Topics (1-0; 1-0)

A reading and seminar course designed to cover biological conservation as practised in North America.

565. **Principles of Conservation and Wildlife Management** (3-3; 3-3)
Management of upland and migratory game birds, big game and fur-bearing mammals; discussion of legal aspects of conservation and the role of sanctuaries, National Parks and wilderness areas.
Prerequisites: Zoology 406, 408. These may be taken as corequisites with permission of department.
(Not offered in 1964-65)

571. **Animal Behavior** (0-0; 3-0)
Advanced problems and recent research in animal behavior with particular emphasis on the social behavior of vertebrates.
Prerequisite: Zoology 471 or consent of department.

582. **Advanced Histology** (0-0; 3-0)
A seminar and project course for students intending to employ histological methods extensively in graduate research.
Prerequisite: Zoology 581 or consent of department.

XXII

The Faculty of Graduate Studies

THE FACULTY OF GRADUATE STUDIES

Graduate work has been offered at the University of Alberta since its inception in 1908. During recent years the numbers of graduate students have increased rapidly, particularly in the programs leading to doctoral degrees. The present organization of the Faculty with a Dean was adopted in 1957.

The degrees offered by the Faculty are the Master of Arts, Master of Education, Master of Science, Doctor of Education and Doctor of Philosophy. All of these are based on programs of study including a thesis project. The Doctor of Letters and Doctor of Science degrees are awarded for outstanding achievement in the humanities or sciences. In 1963 the degrees awarded included 33 M.A., 43 M.Ed., 96 M.Sc., and 41 Ph.D. There were 1,118 students registered in the Faculty in 1963-64. During the winter session there were 848 registered at Edmonton and 66 at Calgary.

The University has continually expanding facilities for advanced study and research, and a steadily growing staff to provide direction in graduate programs.

PROGRAMS IN THE FACULTY OF GRADUATE STUDIES

The Faculty of Graduate Studies administers programs leading to the degrees of Master of Arts, Master of Education, Master of Science, Doctor of Education, and Doctor of Philosophy, and makes recommendations for granting the degrees of Doctor of Science and Doctor of Letters.

Graduate students are admitted to the Faculty in one of the following categories:

1. *Candidate for a master's degree.*
2. *Provisional candidate for a doctor's degree:*
   All Ph.D. and Ed.D. students are admitted as provisional candidates. (See special regulations under Doctor of Philosophy)
3. *Probationary graduate student* is one whose university record is either: (a) difficult to assess (e.g. some foreign students) or (b) below the standard normally required.
4. *Conditional graduate student* is one who is required to take undergraduate courses prerequisite to, and in addition to, the graduate program. Fees for such courses are additional to graduate program fees.
5. *Special graduate student* is one who wishes to take graduate courses for purposes other than degree credit at this university.

The Faculty of Graduate Studies is administered by a Dean and a Council representative of the departments offering graduate work. Inquiries should be addressed to the Dean, Faculty of Graduate Studies.

The general regulations apply to all graduate students. Additional requirements are outlined under the headings: "Master's Degree", "The Degree of Doctor of Philosophy", "The Degree of Doctor of Education", and "The Degrees of Doctor of Science and Doctor of Letters".

GENERAL REGULATIONS

Qualifications for Admission

The requirements for admission to the Faculty are:

(a) a baccalaureate degree or its equivalent with an average mark of at least 65% (University of Alberta basis) in the work of the last two undergraduate years, and

(b) a statement from the head of the department concerned to the effect that the applicant is, in all respects, acceptable to the department.

Applicants should recognize that graduate work differs from undergraduate study in that it requires, in addition to formal course work, initiative and persistent industry directed toward a research project.

After the completion of one academic year a probationary graduate student who has proven his competence to the satisfaction of the department and the Faculty, may be accepted as a candidate for a master's degree or as a provisional candidate for a doctor's degree. If accepted, he may apply to the Faculty to have courses completed during his status as a probationary graduate student credited toward the requirement for a degree. Each such application will be considered on its individual merits. Special graduate students are not considered as candidates or potential candidates for a degree and do not require a departmental recommendation.

Application for Admission

Applications for admission to the Faculty must be submitted on forms supplied by the Dean. No assurance can be given that applications received after August 30 (for the winter session) or April 1 (for the summer session) can be processed in time to permit registration. A graduate of another university must arrange with the Registrar of that institution to forward two transcripts of his academic record to the Dean prior to August 30 or April 1. The Dean may require the applicant to furnish an official description of the content of the courses listed on the transcripts.

Registration

An applicant accepted by the Faculty as a candidate for a Master's degree, as a provisional candidate for the Doctor of Philosophy degree or the Doctor of Education degree, or as a "probationary graduate student", is required:

(a) to register not later than September 24 if he proposes to work on his program during the winter session (departmental approval of Program Form should be obtained during the preceding week); or not later than April 30 if he proposes to work on his program in the summer session;

(b) if he registers later, to pay a late registration fee for the winter session of $3.00 and an additional $1.00 per day for each day which the registration is postponed beyond September 28.

(c) to maintain continuous registration during his program by registering once a year (see Note below);

(d) to present with each registration a program of studies signed by the head

of the department responsible for his graduate study program. Registration and program forms may be obtained from the office of the Dean.

NOTE:—

Starting September, 1964, all students on graduate degree programs must register once a year in order to keep their programs active. This registration entitles students to the use of university facilities and to assistance from their supervisors for a 12-month period. Registration during the final year of the program permits the student to graduate at either of the two following Convocations.

A student who fails to maintain continuous registration will be considered to have withdrawn from his program. If he wishes to resume studies on the program, he must apply for readmission to the Faculty of Graduate Studies and have his program reassessed in terms of the regulations in force at the time of reapplication.

Academic Standards

In any course taken for credit toward an advanced degree the pass mark is 65%. No supplemental examinations are permitted. If, after consulting the department and any committee concerned, the Faculty decides that a candidate is not making satisfactory progress *in either course work or research* the candidate may be required to withdraw.

Intersession Registration

Graduate students who are working full-time on their graduate programs during part or all of the period May to September are encouraged to complete "Intersession Registration". Those holding University Awards during this period must register. Full residence credit is given for this period if the student is registered. There is no fee. Students who register for the Summer Session do not receive Intersession credit for the period of the Session.

Time Limit

To be recommended for a degree a candidate must complete all of the requirements within six years of the time he is first accepted for graduate study.

Thesis and Oral Examination

A candidate for a Master's or a Doctor's degree is required to submit a thesis and pass an oral examination. For purposes of spring graduation, a candidate is required to submit his thesis by April 15 and to have it approved and to pass the oral examination not later than April 29. The corresponding dates for fall graduation are September 21 and October 8, 1964. The thesis must be submitted to the department at least two weeks prior to the date of the oral examination. Failure to meet either of these deadlines will automatically delay graduation unless special arrangements are made through the Dean. The bound thesis must be in the Faculty office by the date of the May or October meeting of the General Faculty Council.

Thesis Regulations

Number and Distribution of Copies

The student shall prepare at least five copies of his thesis, as follows:

1. The *original*, to be deposited in the office of the Faculty of Graduate Studies. This becomes the library copy after it has been examined by the Faculty.
2, 3. To be retained by the Department, or (if the Faculty has its own library) to become the library and the Department copy, respectively. One of these copies will be available for inter-library loan.

4. To be retained by the student.
5. To be retained by the supervisor. With the Department's permission this requirement may be waived.

Further copies may be required in special cases. For example, a student who holds a fellowship or financial assistance donated by a private individual or a company may be expected to provide a copy for the donor. If multiple copies are prepared, and one of these submitted as the original, only the multilith process may be used without special permission from the Faculty of Graduate Studies.

Typing

Any standard type is acceptable but one size and style must be used consistently throughout the thesis. Electric typewriters generally produce the best copies.

Binding

All copies should be bound in buckram (the color to be determined by the supervising Department) with a short title and author's name printed in gold on the spine. Official copies (Nos. 1 - 3) *must* be so bound and lettered.

Paper

Regulation bond, 8½″ x 11″ (16 lb. weight, Bellfast, or equivalent quality, for the initial copy, other copies may be on 13 lb. bond.) One type of paper must be used throughout a given thesis except for charts and figures. With special permission and in special cases, 14″ paper may be used. A photographic process is acceptable for charts and diagrams.

Margins

A minimum left margin of 1½ inches is required.

Order of Items

1. Title page.
2. Approval sheet (including, if desired, an indication of the weight of the thesis in the student's total program).
3. Abstract (not more than two pages).
4. Acknowledgments, if any.
5. Table of Contents (listing chapter heads and subheads, bibliography and appendix, if any).
6. List of Tables, if any.
7. List of Figures or Illustrations, if any.
8. Body of text.
9. Bibliography or references.
10. Appendix, if any.

General Form and Style

This may differ somewhat from Department to Department. The main point is consistency of form, tone, and level in a given thesis. It is recommended that students consult a manual on thesis writing that has been approved by their department.

Writers may use either footnotes or keyed bibliography, or both. Footnotes may be placed either at the foot of the page, or in a group at the end of the chapter or thesis — at the option of the supervising department.

General

University copies of theses are available in the Reference Room of the University Library. All students are requested to look at appropriate examples, and to consult their supervisor or Department Head, before commencing preparation of their theses. Samples of the title page and of the approval sheet are available in the office of the Faculty of Graduate Studies.

SPECIAL REGULATIONS

THE MASTER'S DEGREE

1. Full-time attendance at classes or activity in research or both for a minimum period of one academic year at the University, while registered as a graduate student, is required for a Master's degree. An alternative proposal may be considered if recommended by the department.
2. A candidate entering the Faculty from a four-year specialized program and continuing work in the same field is normally required to complete the equivalent of one calendar year's work. Other candidates are normally required to complete the equivalent of two years' work. Details are determined by the department.
3. Considerable variation is permitted in the balance between the research and courses required for the degree. All candidates must include some course work in the program, and proposals involving research work equivalent to less than two full courses, require Faculty approval.
4. Some summer session and evening courses may be accepted in a Master's degree program, but no more than three may be taken in any twelve-month period without approval of the Dean. Only under special circumstances, and with approval of the departments involved, will extramural courses be accepted for credit.
5. The results of research must be submitted in the form of a thesis conforming to the Faculty regulations.
6. An examining committee of at least three faculty members, one from a department other than that in which the student is registered, must be approved by the Faculty. The committee reviews the thesis and conducts an oral examination designed to test the candidate's knowledge of the thesis subject matter and of related fields. Persons other than the examiners may attend with the approval of the Dean or the chairman of the committee.

THE DEGREE OF DOCTOR OF PHILOSOPHY

1. A student may be admitted as a provisional candidate for the degree of Doctor of Philosophy if he holds a bachelor's or a master's degree, or their equivalent, from an approved university. Admission is contingent upon recommendation by a department and upon the availability of suitable courses of study, library, laboratory and other facilities. The student will remain as a provisional candidate until he has successfully completed his candidacy examination (see section 6 below).

2. The essential factor in the requirements for the doctorate is the demonstration of ability to plan and carry out research of a high calibre leading to an advance in knowledge in the student's major field of study.

3. The time necessary to complete the requirements for the doctorate depends upon the student's progress. For a student with a bachelor's degree the minimum requirement is three academic years of study and research, of which two academic years must be in residence at the University of Alberta. For a student with a master's degree the minimum requirement is two academic years of study and research in residence at the University of Alberta. An alternative method of meeting the residence requirement may be considered on recommendation to the Faculty of Graduate Studies by the department concerned.

4. The student's program shall be under the direction of a committee of not fewer than three members appointed by the Faculty of Graduate Studies. The chairman of the committee shall be the faculty member under whose supervision the student is carrying out his major research. Where appropriate, one or more members of the committee shall be chosen from a department other than that in which the major research is being carried out. The committee shall recommend to the Faculty of Graduate Studies a program of research. The same committee shall arrange for the necessary examinations and for adjudication of the thesis.

5. Before the student takes his candidacy examination, he shall satisfy his committee that he possesses a knowledge of one of French, German, or Russian sufficient for the reading of publications in this language. Departments may demand proficiency in such additional languages as are necessary. Students should check departmental requirements.

6. At least six months before he takes his final examination, the student shall pass a candidacy examination in subjects relevant to the general field of his research, and such other examinations as may be required by his department. Normally an oral examination is required, and will be held when the course work is generally completed and the thesis project well started. The examination shall be under the direction of the supervisory committee to which two other members of the teaching staff have been added. At least one member of the examining committee shall be a person from a department other than that in which the major research is being carried out. Persons other than the examiners may attend only by agreement with the Dean of the Faculty of Graduate Studies or the chairman of the Committee.

7. The results of the candidate's research shall be presented in a thesis satisfying the general requirements of the Faculty of Graduate Studies. The material must be of sufficient merit to meet the standards of reputable scholarly publications.

8. The thesis shall be approved by an examining committee which will consist of the supervisory committee and at least two other examiners, one of whom shall be an external examiner who is a recognized authority in the special field of research. A final oral examination, based largely on the thesis, shall be conducted by the examining committee. Persons other than the Faculty may attend by agreement with the Dean of the Faculty of Graduate Studies.

THE DEGREE OF DOCTOR OF EDUCATION

The degree of Doctor of Education attests proficiency in a program of graduate study in which the emphasis is upon preparation for competent professional performance. The general regulations with respect to admission, residence requirements, candidacy examinations and final examinations for the Ed.D. degree are the same as those listed for the Ph.D. degree with the following exceptions:

(1) Several years of successful teaching and an M.Ed. degree or its equivalent are prerequisites for admission.

(2) A reading knowledge of French is required. Under special circumstances another language may be substituted.

(3) The program emphasizes breadth in educational theory, practice and research rather than intensive specialization in a particular area.

(4) The student's program may make provision for supervised field experiences.

THE DEGREES OF DOCTOR OF SCIENCE AND DOCTOR OF LETTERS

The degree of Doctor of Science (D.Sc.) or of Doctor of Letters (D.Litt.) may be conferred on persons considered by the General Faculty Council to have distinguished themselves by special research or learning in the respective domains of science and of the humanities or social sciences, subject to the following regulations:

1. The degrees of Doctor of Science and of Doctor of Letters are awarded exclusively on the basis of original work of merit carried out by the candidate, either individually or in cooperation with others. In the case of an application based upon cooperative work, the candidate shall submit a written statement indicating the share he personally has taken in the work. A reasonable proportion of the work must have been carried out at the University of Alberta.

2. Application must be made in writing to the Dean of the Faculty of Graduate Studies and should be accompanied by four reprints of all papers and by at least one copy of each book submitted by the candidate. The application, accompanied by the proper fee, must be submitted before the first day of November of the academic year in which it is proposed to take the degree.

PROGRAMS OF STUDY—EDMONTON

This section contains alphabetically, according to departments, brief descriptive paragraphs which outline the departmental facilities, the fields of research and special interests, and special departmental regulations together with titles of graduate courses offered by the departments. Further information on courses, both graduate and undergraduate, will be found in the calendar of the appropriate Faculty or School.

NOTE: In the case of courses in which the weekly hours of instruction are fixed, these are set out for both terms of the winter session. The letter "s" attached to a figure signifies seminar-hours, the letter "a" hours allotted to assignments or discussion of assignments, the letter "L" lecture-laboratory and the letter "P" hours devoted to a project. Otherwise, the first figure in each term indicates lecture-hours and the second laboratory-hours.

AGRICULTURAL ECONOMICS

1. The Department offers programs of course work and research leading to the degree of Master of Science.
2. Research fields in Agricultural Economics include managerial economics, production economics, farm finance, land economics, marketing, prices, policy, and socio-economics of agriculture.
3. Applicants for admission should meet the requirements for an undergraduate degree in this Department but others may be admitted conditionally, subject to the removal of deficiencies.
4. Candidates may expect to take two or three courses in this Department and one or two courses in related fields for the Master's degree. In addition to the courses listed below, senior undergraduate courses may be taken for graduate credit in certain cases.
5. A limited number of teaching and research assistantships are available for qualified applicants.
6. *Graduate Courses*: (offered only when sufficient students enroll)

500. Research Projects in Agricultural Economics	(2-6P; 2-6P)
516. Analytical Techniques	(0-0; 3-3)
533. Production Economics	(3-0; 0-0)
553. Economics of Land Use and Conservation	(3-0; 0-0)
563. Market Structure	(3-0; 0-0)
583. Price Analysis	(3-2; 0-0)
601. Agricultural Economics Seminar	(1s-0; 1s-0)
613. Research Methods	(3-0; 0-0)
633. Resource Efficiency and Allocation	(0-0; 3-0)
663. Market Performance	(0-0; 3-0)
673. Topics in Agricultural Economics	(0-0; 3-0)

AGRICULTURAL ENGINEERING

1. Graduate work leading to the degree of Master of Science may be undertaken in the Department of Agricultural Engineering with the major field of study in Agricultural Mechanization.
2. Course work and graduate research is directed towards developing competence in the quantitative economic approach to the mechanization of farms and ranches, rather than towards the mechanical design of agricultural equipment. Required courses include Statistics, Numerical Analysis, Production, and a graduate course in Operations Research to be offered by the Department of Agricultural Engineering. Research work leading to the preparation of a thesis is generally related to a quantitative assessment of the level of mechanization of some phase of Western Canadian agriculture.
3. Funds are available for one or two graduate students to be engaged by the Department of Agricultural Engineering as Operations Research assistants. Such students should expect to take an extra year to complete the requirements for the Master of Science degree.
4. *Graduate Courses*

601. Operations Research (3-3; 3-3)
The application of statistical and mathematical techniques to selected problems in Agricultural Mechanization.

ANATOMY

Laboratory accommodation for a small number of graduate students is open to Arts and Science graduates and to medical students and graduates who wish to spend a year out of course doing advanced work in medical sciences. Application should be made as early as possible in the year preceding that in which the student plans to work.

ANIMAL SCIENCE

1. Graduate study may be undertaken in genetics, nutrition or physiology in either the Animal or the Poultry Science division of the Department. A well-equipped chemical laboratory is maintained for research purposes.
2. Information regarding assistantships and other forms of financial assistance currently available to students registered in programs for the M.Sc. or Ph.D. degree will be supplied upon request; address inquiries to the head of the Department.
3. The time required to complete a Master's program varies according to the undergraduate training of the student and the nature of the research undertaken. Normally two academic years of course work and research plus one summer of research, or one academic year and two summers, are needed to complete the requirements.
4. Normally M.Sc. students are required to complete two of the Animal Science graduate courses listed below plus at least two approved courses selected from the following areas: Biochemistry, Biometrics, Chemistry, Genetics, Mathematics, Physiology, Statistics and Zoology.
5. Courses for Ph.D. students are selected according to the background and interests of the candidate.

6. *Graduate Courses*

Animal Science

501. Research Projects Max. of 6 hrs. credit

512. Advanced Nutrition—Staff (3-3; 3-0)

600. Seminar—Staff (1s-0; 1s-0)

Biometrics

604. Statistical Techniques in Animal Research (2-3; 0-0)
R. T. Berg

BACTERIOLOGY AND MICROBIOLOGY

1. Laboratory apparatus or bench space is available for two to three graduate students. Apparatus available is adequate for any investigational problem normally expected of Master's candidates. The facilities of the Provincial Public Health Laboratory, which carries out laboratory work for hospitals and practitioners within the northern half of the province, are also available.

2. The Departments will consider investigational problems submitted by candidates in any field involving fundamental or applied bacteriology. Research grants, etc., may be available through the usual channels provided adequate time is allowed for application and approval.

3. Candidates for graduate work will be required to have a reasonable background in bacteriology or microbiology. In this University a reasonable background is indicated by a good standing in either the senior undergraduate course in Medical Bacteriology (i.e. Bacteriology 421 - 361 or the senior undergraduate course in Microbiology (Microbiology 360). Students with an equivalent background from other universities will be considered by the Departments for graduate work. Candidates will be expected to complete with good standing all senior undergraduate courses in medical bacteriology and microbiology which have not been completed during undergraduate years. In addition, much emphasis will be placed on the presentation of original material in seminars, on discussions concerning investigational work in progress in the Departments, and an adequate knowledge of research methods.

4. The following courses from other departments may be accepted in graduate programs: Agricultural Bacteriology (Dairying 465), Dairy Bacteriology (Dairying 466), Soil Microbiology (Soil Science 430), Genetics 451, French 200, Mathematics 255, Biochemistry 511, German 200, and other courses as indicated in individual cases.

5. *Graduate Courses*

501. Microbiology—Members of the Departments

504. Medical Mycology—J. W. Carmichael (0-0; 0-6L) or (0-6L; 0-0)

A study of the fungi which cause disease in man; methods for their demonstration, isolation and identification. Some attention will also be given to the epidemiology, serology and pathology of fungus diseases.

Prerequisites: Bacteriology 361 or Bacteriology 421 and permission of Head of Department.

505. Current Problems in Microbial Physiology (3-0; 3-0)
Members of the Departments

506. Current Problems in Immunology and Virology (3-0; 3-0)
Members of the Departments

507. Advanced Microbiology Seminars (1s-0;1s-0)
Members of the Departments

BIOCHEMISTRY

1. The Department offers a program of course work and research leading to the degree of M.Sc. or Ph.D. Prospective candidates should consult the head of the Department regarding research facilities and course requirements. Teaching assistantships and demonstratorships are often available, as well as financial assistance from research grants to faculty members. Application for financial assistance should be made, if possible, by December of the year previous to that in which the student wishes to begin graduate work. Availability of funds is usually made known by April.
2. The staff of the Biochemistry Department is currently carrying out research in the following fields: cell-virus interactions and mechanisms of viral replication; chemical, physical and biological properties of the nucleic acids; physico-chemical and enzymatic properties of muscle proteins; chemical and physical properties of the proteolytic zymogens and enzymes; the effects of inhibitors, activators and protein reagents on the enzymatic and physico-chemical properties of glycogen phosphorylase and other sulfhydryl enzymes; the biological control of glycogen metabolism; oxidation-reduction processes in reactions catalyzed by peroxidases and catalases; chemistry of mammalian erythrocytes; metabolism of purines and purine analogs in cancer cells; clinical chemistry.
3. A number of courses from the departments of chemistry, bacteriology, physiology, genetics, botany and zoology may be accepted as part of the graduate program in consultation with the head of the department of biochemistry.
4. *Graduate Courses*

501. Advanced Laboratory—Staff (0-3; 0-3)

511. Enzymology (3-0; 0-0)or(0-0; 3-0)
N. B. Madsen and G. R. Schonbaum

521. Nucleic Acids (0-0; 3-0)
J. S. Colter, B. Lane, A. R. P. Paterson and E. E. Townsend

531. Chemistry of Proteins (3-0; 0-0)or(0-0; 3-0)
L. B. Smillie and C. M. Kay

561. Chemistry of the Erythrocyte—H. B. Collier (3-0; 0-0)or(0-0; 3-0)

571. Recent Advances—Staff (3-0; 0-0)or(0-0; 3-0)

N.B.— Not all graduate courses are offered every year. The head of the Department should be consulted regarding the availability of graduate courses in any academic session.

BOTANY

1. The department offers programs leading to the M.Sc. and Ph.D. degrees.

2. Laboratory accommodation for graduate students is available, with facilities for research in plant anatomy, cytology, morphology, ecology, taxonomy, physiology, and mycology.
3. A number of students are appointed as demonstrators in junior courses each year.
4. Certain senior and advanced courses in other science departments are commonly accepted as part of the M.Sc. program in Botany. The Department of Botany must be consulted in the selection of these.
5. *Graduate Courses*

504. Advanced Mycology—H. J. Brodie, L. L. Kennedy (6L; 6L)
506. Advanced Taxonomy—J. G. Packer (6L; 6L)
507. Advanced Plant Anatomy and Histology—R. G. H. Cormack (6L; 6L)
508. Vegetation Analysis—G. H. La Roi (0-0; 3-2)
509. Pollen and Spore Morphology—L. L. Kennedy (0-0; 3-3) or (3-3; 0-0)
510. Environment Analysis—G. H. La Roi (3-3; 0-0)
511. Advanced Plant Ecology—G. H. La Roi (0-0; 3-0)
551. Advanced Plant Biochemistry (3-0; 0-0) or (0-0; 3-0)
531. Advanced Phycology—L. L. Kennedy (6L; 6L)
551. Advanced Plant Biochemistry (3-0; 0-0) or (0-0; 3-0)
Mary Spencer and E. Cossins
(This course is identical to Plant Physiology and Biochemistry 551.)

CHEMICAL AND PETROLEUM ENGINEERING

1. The Department of Chemical and Petroleum Engineering offers facilities for advanced training and research leading to the Ph.D. degree in Chemical Engineering and to the Master of Science degrees in both Chemical and Petroleum Engineering.
2. For the Ph.D. program, all the requirements of the Faculty of Graduate Studies must be met. In addition, the Department requires that the candidates shall have satisfactorily completed approved courses in the major field and in at least one minor. Minimum requirements in the major field are courses equivalent to 21 term hours exclusive of seminar; minimum requirements in the minor field are courses equivalent to 12 term hours. As part of the requirements for demonstrating competence for admission to candidacy for the Ph.D., a student must pass the comprehensive examinations set by the Department. These consist of three written 3-hour examinations embracing the major fields of Chemical Engineering. They are normally taken by the student after one year of graduate studies during which the bulk of the course requirements have been met. Although the timing would depend on circumstances, comprehensive examinations would normally be offered at the end of May.
3. For the Master of Science degree, graduate work comprising both course and research work equivalent to a minimum of 12 months of full-time study is required for a student possessing an undergraduate degree (in the same field) from a recognized university. The Department will also accept qualified applicants for the M.Sc. degree in Petroleum Engineering with degrees in Chemical and Mechanical Engineering and has planned the program so that

these students may be able to complete their course requirements in one academic year. Graduates in other fields may be admitted under special arrangements which may involve the completion of certain key undergraduate courses. The Master programs are designed so that about one-half to two-thirds weight i.e. 18 to 24 term hours is given to course work and the balance to research and thesis, making a total of 36 term hours exclusive of seminar. Certain graduate courses are mandatory. Details of all programs must be worked out in consultation with the Department.

4. In chemical engineering, active research programs are being carried out in the following fields: rheology of non-Newtonian fluids, two-phase flow, hydrocarbon P-V-T- and gas hydrate studies, computer models of chemical reactors, applied mathematics in design, vapor phase reactions of the lower paraffin hydrocarbons, reaction kinetics and catalysis, fluid dynamics of gas-solid systems, process dynamics.

   In petroleum engineering, facilities are available for research in fluid flow through porous media, drilling fluids, electrical and physical characteristics of reservoir rocks, crude oil rheology and pipeline flow, miscible fluid displacement phenomena, flow phenomena in heterogeneous rock systems.

5. Teaching assistantships are available for qualified students on a part-time or full-time basis with remuneration according to the student's background and the hours of service. Scholarships and fellowships are available for research in both the fields of Chemical and Petroleum Engineering. Summer assistance can usually be arranged for students continuing their research through the summer months without scholarship support.

6. *Graduate Courses*

Chemical Engineering—

561. Advanced Heat Transfer	**(3-0; 0-0)**
562. Advanced Mass Transfer Operations	**(0-0; 3-0)**
564. Applied Kinetics and Catalysis	**(0-0; 3-0)**
566. Process Control	**(3-0; 0-0)**
567. Advanced Thermodynamics	**(0-0; 3-0)**
568. Selected Topics in Fluid Mechanics	**(3-0; 0-0)**
572. Graduate Seminar	**(1-0; 1-0)**
577. Mathematical Applications	**(3-0; 0-0)**
578. Advanced Mathematical Applications	**(0-0; 3-0)**
595. Advanced Topics in Chemical Engineering	**(3-0; 0-0)**

Petroleum Engineering—

580. Advanced Physical Properties and Behavior of Petroleum Fluids	**(0-0; 3-0)**
583. Advanced Topics in Petroleum Production Mechanisms	**(3-0; 0-0)**
584. Secondary Recovery	**(0-0; 3-0)**

585. Fluid Mechanics of Natural Gas Production (3-0; 0-0)
592. Graduate Seminar (1-0; 1-0)
595. Advanced Topics in Petroleum Engineering (0-0; 3-0)

CHEMISTRY

1. The Department of Chemistry has research laboratories and instructional facilities for at least one hundred and twenty graduate students proceeding to the M.Sc. and Ph.D. degrees in Chemistry.
2. The active research interests of the staff include:— *Analytical*: polarography; *Electrochemistry*: electrode processes, solvation and transport phenomena; *Inorganic Chemistry*: organometallic compounds, hydrides and metal carbonyls; *Kinetics*: free radical and ionic reactions by mass spectrometry, isotope studies in acid-base catalysis; the reactions of active nitrogen, studies on peptide reactions in aqueous solutions; *Organic*: structural and synthetic studies on natural products, chemistry of indoles, acetals of mercapto polyhydroxy compounds, reductive cleavage of acetals, condensation of substituted toluenes, synthesis via organometallic compounds, reduction of nitro compounds, chemistry of "onium" compounds, conformational analysis, chemistry of large ring compounds, stable free radicals, reactions of acetylenes and allenes, mechanisms and synthesis in carbohydrate chemistry, synthesis and structure activity correlations of antibiotics, bioorganic chemistry, biosynthesis of natural products, nucleic acid sugars; study of condensation reactions of ketones, effect of solvent on dicarbonian nucleophilic character; synthesis of bridge ferrocenes; *Physical Organic*: mechanisms and stereochemistry of solvolytic reactions, kinetics of reactions in solution, electron transfer processes between inorganic ions and organic substrates, reactions of azo and diazo compounds; *Photochemistry*: photochemical kinetics and free radical reactions, primary process studies in photochemistry, reactions of electronically excited atoms and molecules, photosensitized reactions, reaction of radicals with solids; *Protein Chemistry*: physical chemistry of globular proteins and polyamino acids; *Radiation chemistry*: radiation chemistry of organic compounds, radiation initiated free radical chain reactions, radiation induced conductance of organic compounds; *Spectroscopy:* active nitrogen flame studies by N.M.R. and infrared, relation of infrared bond parameters to molecular structure, infrared spectroscopy of organic compounds. Application of ultraviolet and electron spin resonance spectroscopy to problems in molecular structure, high resolution N.M.R.; *Theoretical chemistry*: molecular orbitals, self-consistent-field theory.
3. Candidates for the M.Sc. and Ph.D. degrees in Chemistry should be graduates in Chemistry or Chemical Engineering from approved Universities, who meet the entrance requirements of the Faculty of Graduate Studies. All arrangements must be made through consultation with Professor H. E. Gunning, Head of the Department.
4. *Graduate Courses*

511. Instrumental Methods of Analysis—W. F. Allen (3-6: 0-0)
530. Inorganic Chemistry—W. A. G. Graham (3-3; 3-3)
550. Organic Chemistry—D. Darwish (3-6; 3-6)
551. Qualitative Organic Analysis (2-6; 0-0)
553. Chemistry of Carbohydrates—R. U. Lemieux (0-0; 3-0)

555. **Theoretical Organic Chemistry**—R. J. Crawford (3-0; 0-0)
559. **Natural Products**—W. A. Ayer (3-0; 0-0)
561. **Advanced Organic Synthesis**—K. R. Kopecky (3-0; 0-0)
571. **Colloid Chemistry and Surface Chemistry** (3-3; 0-0)
572. **Advanced Physical Chemistry** (3-6; 3-6)
573. **Electrochemistry** (0-0; 2-6)
583. **Quantum Chemistry**—S. Fraga (0-0; 3-0)
587. **Special Topics in Free Radical Chemistry**—H. E. Gunning (0-0; 3-0)
589. **Statistical Mechanics**—S. Fraga (0-0; 3-0)
591. **Radiation Chemistry**—G. R. Freeman (3-0; 0-0)
593. **Spectroscopy and Molecular Structure** (0-0; 3-0)
K. R. Kopecky
595. **Photochemistry**—H. E. Gunning (3-0; 0-0)
597. **Macromolecular Chemistry**—C. E. Bigelow (3-0; 0-0)
599. **Chemical Applications of Mass Spectrometry**—P. Kebarle (0-0; 3-0)
602. **Departmental Research Seminar**—H. E. Gunning (2s-0; 2s-0)
604. **Advanced Research Seminar**—Chemistry Staff (2s-0; 2s-0)
611. **Analytical Chemistry**—W. F. Allen (3-1; 0-0)
613. **Electroanalytical Chemistry and Polarography** (3-0; 0-0)
W. E. Harris
615. **Advanced Analytical Chemistry**—W. E. Harris (3-0; 0-0)
617. **Analytical Spectroscopy**—W. F. Allen (0-0; 3-0)
631. **Inorganic Chemistry**—W. A. G. Graham (0-0; 3-0)
633. **Advanced Inorganic Chemistry**—W. A. G. Graham (0-0; 3-0)
635. **Inorganic Chemistry**—W. A. G. Graham (0-0; 3-0)
651. **Organic Chemistry**—D. Darwish (3-0; 0-0)
*653. **Organic Chemistry**—D. Darwish (0-0; 3-0)
657. **Physical Organic Chemistry**—D. Darwish (0-0; 3-0)
670. **Advanced Physical Chemistry**—H. E. Gunning (3-0; 3-0)
671. **Physical Chemistry**—C. E. Bigelow (4-0; 0-0)
673. **Physical Chemistry**—C. E. Bigelow (0-0; 4-0)
675. **Nuclear Magnetic Resonance Spectroscopy** (0-0; 3-0)
677. **Physical Chemistry** (3-0; 0-0)
679. **Chemical Kinetics** (0-0; 3-0)
683. **Quantum Chemistry**—F. W. Birss (0-0; 3-0)
685. **Solution Kinetics**—H. B .Dunford (0-0; 3-0)

CIVIL ENGINEERING

1. The Department of Civil Engineering offers programs of course work and research leading to the degrees of Doctor of Philosophy and Master of Science.

Active research programs in the Department include:

Soil Mechanics—strength of cohesive soils under high confining pressures; field piezometer studies; engineering and geological aspects of Upper Cretaceous deposits; application of physical-chemical concepts; triaxial shear strength; consolidation and swelling characteristics.

Highway Engineering—soil stabilization with bitumen, line; cracking of asphaltic concrete pavements; repeated loading of pavements; cyclic triaxial loading of stabilized soil mixtures; studies in geometric design.

Structures and Strength of Materials

Concrete—combined torsion and bending; bond and splitting stresses; shear strength; long columns, bending stresses in hyperbolic paraboloid shells; anchorage bond in prestressed beams.

Steel—deformations in the plastic range; frame stability, ultimate strength of composite sections.

Timber—studies of glulam beams and connectors.

Concrete Technology—freeze thaw durability of concrete; air-entrained concrete; creep and shrinkage.

Hydraulics and Hydrology—analysis of river regime; velocity distribution in transient pipe flow; ice problems; aquifer studies; measurement of rapidly varying pressures; bed and surface level plotting; transport of fluidized solids.

Sanitary Engineering—death rate of pathogenic bacteria in sewage lagoons; settling basin design.

2. Doctor of Philosophy programs are offered in the fields of Soil Mechanics and Foundations, Hydraulics and Hydrology, and Structures and Strength of Materials. The amount of course work in a Ph.D. program varies depending on the candidate's background.

3. Master of Science programs normally consist of eight one-term courses or equivalent, four of which must be in the candidate's major field of interest, plus a thesis. Other weightings between course work and thesis may be arranged.

   A candidate may complete a Master's program in twelve months. However, a student is advised to spend two winter sessions, during which he can devote more time to his thesis topic.

4. Financial assistance is available in the form of graduate teaching assistantships.

5. *Graduate Courses* (Offered only if a sufficient number of students enroll)

510. Pavement Design	(3-0; 0-0)
511. Highway Materials	(0-0; 2-2)
512. Transportation Engineering I	(3-0; 0-0)
513. Transportation Engineering II	(0-0; 3-0)
520. Sanitary Engineering	(3-0; 3-0)
522. Water and Waste Treatment	(0-0; 2-4)
530. Advanced Fluid Mechanics	(3-0; 3-0)
531. Engineering Aspects of Ground Water Hydrology	(3-0; 0-0)
532. Surface Water Hydrology	(0-0; 3-0)
533. River Engineering I	(3-0; 0-0)
534. River Engineering II	(0-0; 3-0)

535. Open Channel Flow I (3-0; 0-0)
536. Open Channel Flow II (0-0; 3-0)
539. Hydraulics of Earth Dams and Related Structures (2-2; 0-0)
540. Soil Mechanics and Foundations (3-0; 3-0)
541. Soil Properties (2-3; 2-3)
542. Advanced Soil Mechanics Problems (0-0; 3-0)
543. Soil Mechanics and Foundations (3-0; 0-0)
544. Earth and Rock-Fill Dams (0-0; 3-0)
555. Cement and Concrete Technology (3-0; 0-0)
561. Plastic Analysis and Design of Structures (0-0; 3-0)
562. Behaviour and Design of Steel Structures (3-0; 0-0)
563. Behaviour and Design of Reinforced Concrete Members (3-0; 0-0)
564. Behaviour and Design of Reinforced Concrete Structures (0-0; 3-0)
565. Behaviour and Design of Prestressed Concrete Structures (0-0; 3-0)
571. Intermediate Structural Analysis (3-0; 0-0)
572. Advanced Structural Analysis (0-0; 3-0)
573. Analysis and Design of Roof Shells (3-0; 0-0)

CLASSICS

1. Certain special facilities available in this Department include: Coins—fairly complete examples of Roman coins of Empire Period (100 in all), and electrotypes of Greek and Roman coins; Glass—a collection of Roman glass (from Norton collections); Antiquities—on permanent loan from the Royal Ontario College of Archaeology, a number of objects useful for the study of Egyptian and Roman History; Vases—five original Greek vases; Slides—a fairly extensive collection of slides on subjects such as the Minoan-Mycenean civilization, Greek sculpture, Greek vase painting, etc.
2. In addition to the regular courses in Linguistics and History the Department can offer introductory courses in Numismatics (see above), Palaeography, Epigraphy, Sanskrit, and General Archaeology. There are *no* provisions for assistantships or fellowships.
3. Graduates from the general course should understand that an M.A. in Classics requires primarily a knowledge of both Greek and Latin. However, an M.A. in Latin or in Latin and French can be arranged in consultation with the Department.
4. French or German junior or senior courses and courses in the History of Philosophy may on occasion appear in M.A. programs.
5. *Graduate Courses*

Greek 501. Plato and Aristotle—Staff (3-0; 3-0)
Greek 502. Homer, Iliad—Staff (3-0; 3-0)
Greek 503. Pindar, Odes—Staff (3-0; 3-0)
Greek 511. Advanced Greek Prose Composition—Staff (1-0; 1-0)
Greek 515. Greek and Latin Epigraphy and Palaeography (3-0; 3-0)
R. J. Buck

Greek 517. Studies in Greek Literature—Staff (3-0; 3-0)
Greek 519. Readings in Greek History—R. J. Buck (3-0;3-0)
Greek 520. The Greek and Latin Epigrams—R. J. Buck (3-0; 3-0)
Latin 501. Cicero, Rhetorical Writings—E. C. May (3-0; 3-0)
Latin 502. Roman Comedy—R. J. Buck (3-0; 3-0)
Latin 504. Greek and Italic Dialects—Staff (3-0; 3-0)
Latin 505. Vergil, Complete Works—Staff (3-0; 3-0)
Latin 506. Sanskrit—Staff (3-0; 3-0)
Latin 507. Petronius, Apuleius—Staff (3-0; 3-0)
Latin 508. Tacitus—Staff (3-0; 3-0)
Latin 509. Tibullus, Propertius, Ovid—Staff (3-0; 3-0)
Latin 510. Roman Satire—Staff (3-0; 3-0)
Latin 511. Advanced Latin Prose Composition—Staff (1-0; 1-0)
Latin 512. The Writing of Latin Verse—Staff (1-0; 1-0)
Latin 517. Studies in Latin Literature—Staff (3-0; 3-0)

COMMERCE

1. The Faculty of Commerce offers a program of study leading to the degree of Master of Business Administration. The M.B.A. Program is for the qualified student who seeks preparation for a professional career in management.
2. No specific undergraduate major or series of courses is required for entrance. The M.B.A. program, however, has been designed primarily for individuals who have their undergraduate academic training in the liberal arts, engineering, or the sciences.
3. The time required to complete a Master's program varies according to the undergraduate training of the student and the thesis undertaken. Normally two academic years of course work and research are needed to complete the requirements.
4. The first year of the program consists of accelerated undergraduate courses designed to provide the student with a foundation for undertaking graduate study in business administration. The first year of study covers the areas of accounting, finance, marketing, production, research methodology, and quantitative analysis. In the second year of study the student is required to take Business 550, 551, 552, 553, and one of the advanced seminars. Only the accelerated undergraduate courses will be offered in the academic year 1964-65.
5. A limited number of fellowships and teaching assistantships are available.
6. *Graduate Courses*

Business

550. Business Analysis
551. Administrative Policy
552. Business Policy
553. Business and its Environment

Advanced Seminars

560. Advanced Accounting Seminar

561. Advanced Finance Seminar

562. Advanced Production Seminar

563. Advanced Marketing Seminar

564. Advanced Personnel Seminar

COMPARATIVE LITERATURE STUDIES

Applicants for graduate work in Comparative Literature should, in their previous programs, have concentrated in the literature of one particular language. They must have a competent reading knowledge of at least one language other than English in order to undertake an M.A. program. Graduate programs in Comparative Literature will be arranged and administered by an Interdepartmental Committee comprised of members from the Departments of Classics, English, Germanic Languages and Literature, Romance Languages and Literature, and Slavonic Languages and Literature.

The following courses may be taken for graduate credit in addition to relevant graduate courses in literature offered by individual departments:

520. Comparative Studies in Medieval Literature	(3-0; 3-0)
530. Comparative Studies in European Drama of the Sixteenth and Seventeenth Centuries	(3-0; 3-0)
550. Comparative Studies in Romantic Literature	(3-0; 3-0)
555. Comparative Studies in Literature of the late Nineteenth Century	(3-0; 3-0)
620. Comparative Slavonic Literature	(3-0; 3-0)
649. Franco-German Literary Relations during the Nineteenth Century	(3-0; 3-0)
695. Anglo-German Literary Relations from the Sixteenth to the Nineteenth Century	

COMPUTING SCIENCE

1. The Department offers a program of course work and research leading to the Master of Science degree. The aim of the program is to acquaint students with topics of current interest in numerical analysis and related fields and to train them in the efficient use of numerical techniques. A thesis is required on an approved topic.
2. The work of the degree will normally require one year following graduation from a program equivalent to the honors mathematics or physics programs at the University of Alberta. The Department will also consider good students with different backgrounds, for example, graduates in engineering physics and engineering although in these cases the program will likely take more than one year.
3. The required graduate courses are Mathematics 600 and Computing Science 640 and 641.
4. *Graduate Courses*

640. Advanced Numerical Analysis	(3-3;-3-3)
641. Automatic Digital Computers and Programming	(3-6; 3-6)

DAIRY SCIENCE

1. Graduate study may be undertaken in any of the three divisions of the department:

   Dairy and Food Technology;
   Dairy and Food Chemistry;
   Agricultural, Dairy and Food Microbiology.

   A well equipped small scale dairy and food processing laboratory, as well as chemical and microbiological laboratories are available for research purposes.

2. The research of this department receives financial support from such bodies as the Department of Agriculture, Ottawa; The National Research Council of Canada and the National Defence Research Board. Such grants-in-aid provide for a number of assistantships. The assistants, if eligible, are permitted to register in the Faculty of Graduate Studies and their research findings may be presented to the University as M.Sc. or Ph.D. theses. Various Graduate Fellowships and Scholarships, such as those offered by the above-mentioned organizations are tenable in the department.

3. Ordinarily Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300, Chemistry 372, Mathematics 200 or 201 and (a) Dairy and Food Technology 352, 353, or (b) Agricudtural and Food Microbiology 465, or (c) Dairy Microbiology 466, or (d) Food Chemistry 475 or Dairy Chemistry 476 or their equivalents are admission requirements.

   A reading knowledge of French, German or Russian within the field of interest is required for candidacy for the Ph.D. degree, but credit in approved University courses is an acceptable substitute.

   Graduates who desire to take a graduate degree should consult a member of the department who may be able to suggest a program of study suited to the interests of the student.

4. Extra-departmental undergraduate courses for which graduate credit may be given are, Animal Science 468, 469; Microbiology 402; Plant Biochemistry and Physiology 431, 432; Biochemistry 300; Soil Science 430; Biometrics 455; Horticulture 455; Plant Pathology 480.

5. *Graduate Courses*

Dairy Science 500. Seminar—L. F. L. Clegg, F. W. Wood and J. M. deMan

Dairy and Food Chemistry 571—J. M. deMan (0-0; 3-3)

Dairy and Food Technology 600—F. W. Wood and L. F. L. Clegg

Dairy and Food Microbiology 601—L. F. L. Clegg and H. Jackson

Dairy and Food Chemistry 602—J. M. deMan and L.F.L. Clegg

Dairy and Food Chemistry 572—J. M. deMan (0-0; 1-3)

DENTISTRY

1. The Faculty of Dentistry has research laboratories and instructional facilities for a limited number of graduate students proceeding to the M.Sc. degree.

2. Dental graduates may undertake graduate programs in either basic science or clinical science. Students without dental qualifications, but who hold a B.Sc. degree in biological or physical science are eligible for graduate work in the division of basic research in dentistry.

3. Fellowships and assistantships are available. Applications may be submitted at any time throughout the year.

4. The active research interests of the staff include:—

Anatomy—growth and development; calcification and decalcification; mammalian cell and organ culture.

Biochemistry—absorption and metabolism of calcium and phosphorus; glycoproteins and iron metabolism of tumor-bearing animals; enzymes of the gastrointestinal tract.

Dental Materials—experimental swaging, stress analysis of patterns and castings; dispersion hardening of dental amalgams; toxicity studies on newly developed restorative materials.

Microbiology—animal cell culture; virology; bacteriology; immunology.

Dental Public Health and Epidemiology—growth patterns of young children; fluoride intake; topical fluoride; administration of public health programs.

Clinical Dentistry—pediatric dentistry including interceptive orthodontics and treatment for handicapped children.

5. *Graduate Courses*

Dentistry 500. Cephalometrics (1-3; 1-3)
Prerequisite: Permission of the department.

Dentistry 501. Advanced Pedodontics (1-6; 1-6)
Prerequisite: Permission of the department.

EDUCATIONAL ADMINISTRATION

1. The Department of Educational Administration offers graduate instruction in a variety of programs in school administration. More particularly these programs are designed to assist students to prepare to serve as principals, superintendents of schools, and central administration officers, officers of provincial departments of education, and as professors of educational administration.

2. The Department makes special arrangements with public school systems and provincial departments of education so that facilities are available for student observation, research, participation in field projects and internships.

3. The work of the Department is closely coordinated with that of other departments in the Faculty of Education. Furthermore, approved courses complementing or supplementing a candidate's program in education may be taken from other departments in the University.

4. The research facilities provided through the Alberta Advisory Committee on Educational Research, sponsored jointly by the Faculty of Education, the Department of Education, the Alberta School Trustees' Association, The Alberta Teachers' Association, and the Alberta Federation of Home and School Associations, are available to graduate students in this Department. The Alberta Journal of Educational Research published under supervision of the Faculty is the official outlet for reports of research sponsored by the Alberta Committee on Educational Research.

5. Students who satisfy the admission requirements of the Faculty of Graduate Studies and who have the approval of the Department may pursue programs of

study and research leading to the degrees of M.Ed., Ed.D., and Ph.D. in Educational Administration. Prospective students should first consult the Head of the Department for further information on the program and admission requirements.

6. A number of fellowships and teaching assistantships are available for well-qualified candidates.

7. *Graduate Courses*

Ed. Adm. 500. Research Seminar
Non-credit. Hours to be arranged.

Ed. Adm. 525. Administration of Educational Personnel (3-0; 0-0)

Ed. Adm. 599. Administration of Public Education in Canada (3-0; 0-0)

Ed. Adm. 561. Evolving Concepts in Educational Administration (0-0; 3-0)

Ed. Adm. 563. Administration of the Educational Program (0-0; 3-0)

NOTE: Full-year courses corresponding to the above four half-year courses (525, 559, 561, and 563) are designated Ed. Adm. 526, 560, 562 and 564 respectively.

Ed. Adm. 566. Educational Finance (3-0; 3-0)

NOTE: Courses numbered in the 600's are conference courses in which credit is given according to work done, to a maximum of six hours.

Ed. Adm. 626. Educational Supervision

Ed. Adm. 660. The Organization and Government of Public Education

Ed. Adm. 662. The Problems of Educational Administration and Supervision

Ed. Adm. 664. The Administrative Role of Principals and Superintendents

Ed. Adm. 666. Educational Finance

EDUCATIONAL FOUNDATIONS

1. In this Department graduate programs leading to the M.Ed., Ph.D. and Ed.D. degrees are available in philosophy of education, history of education, sociology of education, and comparative education.

2. Graduate programs normally include related courses offered by liberal arts departments and may include courses from other departments of the Faculty of Education.

3. Inquiries concerning admission, programs, and teaching assistantships should be directed to the Head of the Department of Educational Foundations.

4. The research facilities provided through the Alberta Advisory Committee on Educational Research are available to graduate students in this Department. *The Alberta Journal of Educational Research* is the official outlet for reports of research sponsored by the Alberta Advisory Committee.

5. *Graduate Courses*

500. Education Seminar—Staff

514. Sociology of Education—B. Y. Card (3-0; 3-0)

571. Studies of Educational Change in Western Nations—R. E. Eick (3-0;0-0)

573. Functions of Education in the Development of Western Nations—R. E. Eick (0-0; 3-0)

581. History of Education in Western Europe Before 1900—K. H. Thomson (3-0; 0-0)

583. History of Education in the United States Before 1900—K. H. Thomson (0-0; 3-0)

592. Philosophy of Education (3-0; 3-0)

EDUCATIONAL PSYCHOLOGY

1. The Department of Educational Psychology provides instruction and guidance for suitable candidates proceeding to the degrees of M.Ed., Ph.D., and Ed.D. in the areas of: (a) Educational Psychology; (b) Child Psychology; (c) Adolescent Psychology; (d) Mental Hygiene; (e) Guidance; (f) Testing and Measurement; (g) Exceptional Children.
2. The Department operates an Education Clinic which provides testing, diagnosis of special difficulties, and guidance for pupils referred to it from elementary and secondary schools.
3. Staff members and graduate students have access to a modest IBM installation housed in the Education Building, and to the facilities of the University's Computing Centre.
4. One assistantship in the Education Clinic is usually available in winter sessions and in those Summer Sessions when the Clinic is in operation. In addition, a number of research and teaching assistantships normally are available in winter sessions.
5. Before a student is admitted to candidacy for a graduate degree in the Department of Educational Psychology, his record must be acceptable to the Faculty of Graduate Studies and to the Department. The student should first consult with the Head of the Department who, together with members of the Department staff, will plan an appropriate program.
6. The Department of Educational Psychology maintains a close liaison with the Alberta Advisory Committee on Educational Research. The AACER, which was originally established with the aid of a grant from the Carnegie Corporation of New York, is now sponsored jointly by the Faculty of Education, the Alberta Department of Education, the Alberta School Trustees' Association, the Alberta Teachers' Association, and the Alberta Federation of Home and School Associations. *The Alberta Journal of Educational Research,* published under the supervision of the Faculty of Education, is the official outlet for reports of research sponsored by the Alberta Advisory Committee on Educational Research.
7. *Graduate Courses*

500. Education Seminar—Staff

502. Introduction to Educational Research—J. D. Ayers

508. Problems in Educational and Vocational Guidance C. M. Christensen

510. Counselling in Education—C. M. Christensen

552. Social Psychology of School and Classroom—J. Macdonald

570. Child Psychology—R. J. C. Harper

572. Psychology of Adolescence—C. C. Anderson

574. Education Clinic—W. B. Dockrell

576. Statistics and Research Design in Education—J. D. Ayers

578. Advanced Testing and Measurement—R. S. MacArthur

610. Advanced Theory and Practice of Counselling—C. M. Christensen

670. Conference Course in Developmental Psychology
C. C. Anderson, R. J. C. Harper

674. Conference Course in Problems of Adjustment of School Children
C. C. Anderson

676. Conference Course in the Psychology of Learning
R. J. C. Harper

678. Conference Course in Educational Measurement and Experimental Research—S. Hunka

ELECTRICAL ENGINEERING

1. Graduate work is offered by the Department of Electrical Engineering for electrical engineering graduates.
2. The Department has facilities for research work in communication, UHF and servo mechanism fields, and possesses modern research equipment including pulse type oscillographs. It also embodies a high voltage laboratory, equipped for investigation up to 100 kV 60 cycle and up to 400 kV impulse. Investigation can be undertaken in the fields of insulation, power transmission, radio, and telephone interference problems.
3. Part-time instructorships are available for graduate students who normally carry auxiliary courses in mathematics and physics. While these are usually in the graduate pattern, certain undergraduate courses are accepted if they are appropriate to the graduate program.
4. Graduate courses normally offered are:

521. Electric Circuits, Modern Power Transmission Problems (2-6; 2-6)
550. Network Analyses and Synthesis (3-0; 3-0)
561. Principles of Servomechanisms (2-6; 2-6)
562. Sampled-Data Control Systems (2-3; 2-3)
591. Electromagnetic Engineering (2-6; 2-6)
592. Waves in Plasma (3-0; 3-0)

ELEMENTARY EDUCATION

1. The Department of Elementary Education offers graduate instruction in a variety of programs related to kindergarten, primary and elementary education. These programs are designed to help prepare special consultants and supervisors, master teachers and personnel for teacher education institutions. The Department offers a Ph.D. program in Reading only.
2. The Department makes special arrangements with local school systems and the Alberta Department of Education so that facilities are available for student observation, research, and participation in field projects. Graduate students may

also be associated with the Reading Clinic operated by the Department which makes provision for the diagnosis and treatment of reading disabilities among children and young adults referred to the Clinic by neighbouring school systems.

3. The work of the Department is closely coordinated with that of other departments in the Faculty of Education. Furthermore, approved courses complementing or supplementing a candidate's program in education may be taken from other departments in the University.

4. The research facilities provided through the Alberta Advisory Committee on Educational Research, sponsored jointly by the Faculty of Education, the Department of Education, the Alberta School Trustees' Association, the Alberta Teachers' Association, and the Alberta Federation of Home and School Associations are available to graduate students in the Department. *The Alberta Journal of Educational Research* published under the supervision of the Faculty is the official outlet for reports of research sponsored by the Alberta Advisory Committee on Educational Research.

5. Before a student can be admitted as a candidate for the M.Ed. or higher degree his record must be acceptable to the Faculty of Graduate Studies and to the Department. He should first consult the Head of the Department who, together with the members of his staff, will plan an appropriate program.

6. Full-time attendance for a minimum period of one academic year at the university is required for the M.Ed. degree in elementary education.

7. A number of teaching assistantships are available for well-qualified candidates.

8. *Graduate Courses*

Ed. CI 500. Elementary Education Seminar—Staff

Ed. CI 518. Physiology and Psychology of Reading—Marion D. Jenkinson

Ed. CI 520. Clinical Study of Remedial Reading—Dorothy M. Lampard

Ed. CI 522. Organization and Supervision of the Reading Program
Marion D. Jenkinson

Ed. CI 528. Program Development in Elementary School Mathematics—L. D. Nelson

Ed. CI 538. Program Development in Elementary School Language—R. D. Armstrong

Ed. CI 602. Conference Course in Elementary Education
W. H. Worth and Staff

Ed. CI 618. Research in Reading—Marion D. Jenkinson

ENGLISH

1. The Department of English offers graduate work leading to the M.A. and Ph.D. degrees in English Language and Literature.

2. The department has regular provision for teaching assistantships. Application should be made, if possible, by April 1.

3. Program leading to the M.A.:

The total work of a student with an honors B.A. in English (or its equivalent) will normally consist of three graduate courses in the department, a thesis, and

an oral defence of the thesis. The student will spend a minimum of one year in residence. The total work of a student from the general undergraduate program will normally consist of seven courses (4 undergraduate, 3 graduate), a thesis, and an oral defence of the thesis. A reading knowledge of one foreign language will be required of all students (normally French or German, though other languages may be approved).

4. Program leading to the Ph.D.:
A student with an M.A. in English (or its equivalent) may be admitted as a provisional candidate for the Ph.D. degree. During the first year the student will be required to pass a qualifying examination, designed to test his fitness for advanced study. The total work of a provisional candidate will normally consist of four graduate courses (one of which will be taken outside the Department of English), and general examinations on English Language and Literature, written and oral. The student must demonstrate a reading knowledge of two foreign languages (usually French and German). After a student has passed all examinations, he will become a candidate for the Ph.D., and will then submit a thesis and make an oral defence of the thesis. The student will normally spend two years in residence.

5. Courses of study will be prescribed from the published list of Senior Undergraduate courses, and from the following graduate courses.

552. Conference Course	(3-0; 3-0)
560. Bibliography and Methods of Research	(1-0; 1-0)
568. Literary Criticism (Principles and History)	(3-0; 3-0)
576. Study of Language	(2-0; 2-0)
584. Advanced Course in Writing	(3-0; 3-0)
588. Studies in American Literature	(3-0; 3-0)
592. Old Norse and Germanic Philology	(3-0; 3-0)
610. Old English	(3-0; 3-0)
616. Chaucer and his Contemporaries	(3-0; 3-0)
622. The Scottish Chaucerians and English Literature of the Fifteenth Century	(3-0; 3-0)
628. Mediaeval Drama	(3-0; 3-0)
634. Spenser and Donne	(3-0; 3-0)
640. Shakespeare and his Contemporaries	(3-0; 3-0)
646. Early Seventeenth Century Poetry and Prose	(3-0; 3-0)
652. Milton	(3-0; 3-0)
658. Eighteenth Century Prose	(3-0; 3-0)
664. Studies in the Romantics	(3-0; 3-0)
670. Currents of Thought in English Literature since 1790	(3-0; 3-0)
671. Studies in Victorian Poetry	(3-0; 3-0)
672. Studies in the Victorian Novel	(3-0; 3-0)
676. Studies in the Modern Novel	(3-0; 3-0)
682. Studies in Twentieth Century Poetry	(3-0; 3-0)

ENTOMOLOGY

1. Laboratory space is available for about fifteen graduate students. For research in taxonomy an extensive collection and reprint library exists. There is basic equipment for study and experiment in morphology, physiology, ecology, and applied entomology. Funds for special projects can usually be made available.
2. Candidates may register for the M.Sc. or Ph.D. degree.
3. Programs may include Entomology 314, 471, 476, 522, 556, 560, 610, 621, and 650 and courses from other departments appropriate to the students' needs and interests, such as the following: Bacteriology 400, Biochemistry 350, Botany 301, 302, 310, 320, 504, 505, Chemistry 372, 312, Geology 353; German 310, Genetics 462, Philosophy 360, Physics 341, Physiology 361, 462, 505, 506, Plant Pathology 481, Biometrics 454, 603, Mathematics 255, 450, Soil Science 430, Zoology 300, 320, 350, 460, 580, 521.
4. *Graduate Courses*

522. Insect Taxonomy—G. E. Ball (2-6; 2-6)

556. Insect Physiology—B. Hocking (2-4; 2-4)

560. Insect Ecology—W. G. Evans (2-4; 2-4)

*__610. Advanced Morphology, Histology__—Janet Sharplin

621. Advanced Taxonomy—G. E. Ball (0-6; 0-6)

*__650. A Project in Insect Physiology__—B. Hocking

*No set hours: Credit according to work done, up to a maximum of *one* full course.

GENETICS

1. The Department offers programs leading to the M.Sc. and Ph.D. degrees.
2. The department has excellent laboratory facilities for research in a number of fields, including cytology and cytogenetics, microbial genetics, radiation genetics, biochemical genetics. Extensive facilities are also available for plant genetics; these include greenhouse, growth chamber and field-plot accommodation. Additional facilities such as an electron microscope, computer and Van de Graaf accelerator are available on an interdepartmental basis.
3. Investigations being carried out in the department include studies with monosomics of *Triticum,* cytogenetics of *Medicago,* genetics of *Hordeum,* radiation and chemical mutagenesis, biochemical genetics, biometrical genetics, physiology of cell division, and the genetics and biochemistry of parasitism.
4. Eligible applicants will be admitted for graduate work only if facilities and space are available for the project they propose to undertake. Graduate students are not required to take a foreign language for the Master's degree but are advised to do so if they plan to continue beyond it.
5. Normally all senior courses are acceptable in the graduate program. It should be emphasized that course outlines are normally based on the student's previous training and anticipated needs in the field he has chosen.
6. *Graduate Courses*

505. Reading and Research projects in Genetics and Plant Breeding—Genetics Staff (1s-0; 1s-0)

517. Genetical Statistics—L. P. V. Johnson, G. W. R. Walker (3-3; 0-0)
545. Biochemical Genetics—J. Weijer (0-0; 3-0)
552. Radiation Genetics—J. Weijer (0-0; 3-3)
583. Evolutionary Genetics—Clayton Person (0-0; 3-0)
588. Developmental Genetics—R. Ruth (0-0; 3-0)
590. Classic Contributions to Genetics—L. P. V. Johnson (3-0; 0-0)
601. Genetics Seminar (1s-0; 1s-0)
610. Current Problems in Genetics—Genetics Staff (0-0; 3-0)
635. Advanced Microbial Genetics—J. Weijer (0-4; 0-4)
640. Advanced Genetics—Genetics Staff (3-0; 0-0)
650. Genetics of Parasitic Systems—Clayton Person (3-0; 0-0)

GEOGRAPHY

1. The Department of Geography offers the M.A. and the M.Sc. in Geography.
2. Candidates' programs will be prepared under the regulations for "The Master's Degree", with the further requirement of a reading knowledge of a modern foreign language other than English (ordinarily French or German).
3. A number of teaching assistantships are available for qualified students.
4. Courses in other departments may be chosen as subjects of minor interest with the approval of the Department.
5. Courses of study will be prescribed from the published list of senior undergraduate courses and from the following graduate courses:

Geography—

500. History and Nature of Geography (1-2s; 1-2s)
501. Air Photo Interpretation—A. H. Laycock (6L; 6L)
502. Reading and Seminar Course—Staff
504. Mediterranean Lands (3L-1s; 3L-1s)
506. Scandinavia—W. C. Wonders (3-1s; 3-1s)
510. Historical Geography—Staff (1-2s; 1-2s)
525. Field School in Geography—Staff
550. Research in Regional Geography—Staff
551. Research in Physical Geography—Staff
552. Research in Human Geography—Staff
553. Special Problems—Staff

GEOLOGY

1. The Department of Geology offers graduate work to the level of the Doctor's degree. The M.Sc. or Ph.D. degree may be obtained by passing satisfactorily a suitable program of studies in addition to the presentation of a thesis.
2. The fields of study open for research in the Department are: mineralogy, petrology, geochemistry, geochronology, paleontology, stratigraphy, sedimentation, economic geology, geomorphology, glacial geology and structural geology. Teaching assistantships are available for qualified students.

3. *Graduate Courses*

501. Advanced Structural Geology—H. A. K. Charlesworth (0-0; 3-0)

502. Sedimentary Petrology and Sedimentation—J. Lerbekmo (2-0; 2-0)

503. Advanced Stratigraphy—C. R. Stelck, D. E. Jackson (3-3; 3-3)

507. Advanced Igneous and Metamorphic Petrology (0-0; 3-3)
R. A. Burwash

508. Precambrian Geology—R. A. Burwash (3-3; 0-0)

510. Advanced Mineralogy—F. A. Campbell (6L; 6L)

511. Regional Structural Geology—H. A. K. Charlesworth (0-0; 3-3)

512. Pleistocene Geology—L. A. Bayrock (0-0; 3-3)

513. Field Work in Geomorphology and Glacial Geology One day of field work each week (½-year course)

514. Rock Analysis—H. Baadsgaard

515. Advanced Micropaleontology—J. H. Wall (2-4; 0-0) or (0-0; 2-4)

517. Advanced Geochemistry—H. Baadsgaard (0-0; 3-3)

609. Geological Research—Members of the Department

610. Isotope Geology—H. Baadsgaard (3s-0; 0-0) or (0-0; 3s-0)

611. Palynology—C. R. Stelck (3s-3; 0-0) or (0-0; 3s-3)

612. Ore Deposits—F. A. Campbell (3s-3; 0-0)

GERMANIC LANGUAGES AND GENERAL LINGUISTICS

1. The Department of Germanic Languages and General Linguistics offers graduate work leading towards the M.A. and Ph.D. degrees in various areas of German literature and Germanic linguistics and philology. Studies leading toward the M.A. in General Linguistics are described under Linguistic Studies.

2. The German collection in the University Library is fully adequate for purposes of advanced research in a number of areas in German literature and Germanic linguistics and philology, and it is being expanded very rapidly. For students engaged in specific research projects, essential materials will be acquired. In addition, the University's *Georg Kaiser Collection* offers a rare opportunity for research into the life and work of this author, using photocopies of original material much of which is still unpublished.

3. The attention of prospective candidates is directed to the general requlations of the Faculty of Graduate Studies. Inquiries regarding individual programs should be directed to the Head of the Department.

4. Graduate Teaching Assistantships are available to qualified students. For details please see Awards and Financial Assistance.

5. *Graduate Courses*

German Language and Literature

510. Advanced German Composition and Conversation (3-0; 3-0)

595. Bibliography and Methodology (2-0; 2-0)

600. An Introduction to the Study of Lyric Poetry: Goethe's Poems (3-0; 3-0)

603. German Poetry from the Twelfth to the Nineteenth Century	(3-0; 3-0)
606. The Development of German Drama	(3-0; 3-0)
609. Development of the German Novelle, with Emphasis on the Nineteenth Century	(3-0; 3-0)
612. The German Roman from Johann Fischart to Jacob Wasserman	(3-0; 3-0)
615. History of German Literature to the Age of Goethe	(3-0; 3-0)
630. Lessing and the Period of Enlightenment	(3-0; 3-0)
640. Goethe's Faust and the Faust Legend	(3-0; 3-0)
650. Schiller's Historical Dramas	(3-0; 3-0)
660. Heinrich Heine and the Young Germany Movement	(3-0; 3-0)
670. The German Drama of the Nineteenth Century	(3-0; 3-0)
680. The Life and Works of Gerhart Hauptmann	(3-0; 3-0)
690. Contemporary German Poetry	(3-0; 3-0)
698. Special Topics in German Literature	(3-0; 3-0)
699. Conference Course	(3-0; 3-0)

Germanic Linguistics and Philology

530. Middle High German Literature and Philology	(3-0; 3-0)
540. Old High German	(3-0; 0-0)
550. Gothic	(3-0; 0-0)
510. History of the German Language	(0-0; 3-0)
575. Studies in Indo-European	(3-0; 0-0)
580. Comparative Germanic Grammar	(0-0; 3-0)
590. Old Saxon	(0-0; 3-0)
697. Special Topics in Germanic Linguistics and Philology	(3-0; 3-0)
Scandinavian 590. Old Icelandic	(3-0; 0-0)

HISTORY

1. The Department offers instruction leading to the Ph.D. degree in several fields in Modern European, British, Canadian, and United States history. It offers the M.A. degree in these and related fields. The research facilities of the University Library are extensive in many parts of these fields, and they are growing rapidly in others.
2. Candidates for the M.A. degree who do not hold a four year Honors B.A. in History, or its equivalent, must pass a set of comprehensive, written examinations in broad fields of History before proceeding with their graduate work; preparation for these examinations normally requires at least one academic year. All candidates for the M.A. must demonstrate a reading knowledge of either French or German or, in special cases, another foreign language closely related to the candidate's studies.
3. Students working toward the Ph.D. degree must satisfy the following Departmental requirements, in addition to those of the Faculty.

   Before taking his candidacy examinations the student must demonstrate a

reading knowledge of two foreign languages acceptable to the Department. The student must attempt at least one of the languages during his first year of study.

Before he is admitted to candidacy for the doctorate the student must pass three written examinations in special fields (examples: New France, Tudor England, 19th century United States) and one oral examination in the broad field of his thesis. The oral examination is designed to ascertain the student's general competence in the subject, including matters of fact, bibliography, and interpretation. The examination will normally be in one of the following fields: Europe since 1648; Britain and the Empire since 1485; Europe and the Americas in the Colonial Age, 1492-1776; Canada and its European and North American background; The United States and its European background, 1492-1941.

4. All students expecting to receive a graduate degree in History must take History 602 and a research seminar or their equivalent; students who have previously written a satisfactory Master's thesis or completed other substantial research in primary sources may be considered to have met the seminar requirement. Graduate students may enroll in the specialized courses at the 400 level, listed in the calendar of the Faculty of Arts and Science. The Department considers, however, that graduate study is essentially private study under the direction of specialists, and therefore expects that graduate students preparing for examinations will normally register for the programs of directed reading available at the 500 and 600 level. The courses numbered 620 to 699 are essentially subjects in which members of the Department are prepared to supervise private reading. No graduate courses are available extramurally, or in the Evening Division or the Summer Session.

5. *Honors and Graduate Courses*

511. British Medieval History (Comprehensive)

512. British Modern History (Comprehensive)

513. Canadian History (Comprehensive)

514. American History (Comprehensive)

515. Medieval European History (Comprehensive)

516. European History, 1500-1789 (Comprehensive)

517. European History, 1789-1939 (Comprehensive)

518. Slavonic and Soviet Studies: an interdepartmental seminar

6. *Graduate Courses*

600. Conference Course

Directed study in special subjects to meet individual requirements.

602. Philosophy of History and Historiography—H. Liebel (3-0; 3-0)

605. Research Seminar (3-0; 0-0) and/or (0-0; 3-0)

The following courses are designed as opportunities for private reading under faculty direction, for students preparing for graduate examinations.

620. Topics in Medieval European History

624. England in the Late Middle Ages—F. D. Blackley

628. The Age of the Reformation—J. N. Wickenden

631. European Intellectual History since 1500—H. Liebel
635. Europe from 1715 to 1815
642. Germany since 1815—L. Hertzman
648. Russia in the Nineteenth Century—M. Katz
651. Tudor and Stuart England—W. J. Jones
655. Britain in the Nineteenth Century—W. B. D. Heeney
661. Canada to 1791
665. Canada since 1841—B. Fraser
668. Western Canada—L. G. Thomas
674. The United States in the Nineteenth Century
681. Africa South of the Sahara—D. L. Wiedner
689. Western Diplomacy in Eastern Asia, 1850-1950—B. Evans

HOUSEHOLD ECONOMICS

1. Graduate work leading to the degree of Master of Science may be undertaken in the School of Household Economics. The major work may be done only in the field of nutrition where excellent facilities are available for a limited number of students interested in fundamental research. At present research work in the department is centred around the lipids.

2. A candidate may normally expect to take two academic years plus one summer to fulfill the requirements. For students proceeding from a general undergraduate program, six courses plus a thesis are required. When the thesis undertaken is a major piece of work, the number of courses may be reduced.

3. Programs may include Household Economics 500, 502, (or 502 and 503), and courses from other departments such as: Animal Science 512; Biochemistry 400, 511, 521, 531, 561; Biometrics 455, 604; Chemistry 312, 370, 450; Pharmacy 501, 502; Food Chemistry 475, 571.

4. *Graduate Courses*

500. Seminar—Staff (1s-0; 1s-0)
502. Research Project in Nutrition—Staff (3L; 3L)
503. Further Research Project in Nutrition—Staff (3L; 3L)

INDUSTRIAL AND VOCATIONAL EDUCATION

1 The Department of Industrial and Vocational Education offers programs leading to the M.Ed. degree in Industrial Arts and in Vocational Education .

2. The work of this Deaprtment is closely coordinated with that of other Departments in the Faculty of Education and with other faculties and schools of the University.

3. Graduate programs in Industrial Arts and in Vocational Education normally include both professional courses in education and senior or graduate courses offered by other faculties and school in the University.

4. Before a student can be admitted as a candidate for the M.Ed. degree, his record must be acceptable to the Faculty of Graduate Studies and to the Department. The prospective candidate should first consult the Head of the Department of

Industrial and Vocational Education who, together with other members of the staff, will plan an appropriate program.

5. A number of assistantships are available to well-qualified candidates for the M.Ed. degree.

6. *Graduate Courses*

Industrial Arts Education

Ed.I.A. 589. Organization of Industrial Arts Education—Staff (3-0; 0-0)

Ed.I.A. 591. Problems and Trends in Industrial Art Education (0-0; 3-0)
Staff

Ed.I.A. 594. Research and Development Seminar in Industrial Arts Education—Staff (3-0; 3-0)

Vocational Education

Ed.Voc. 589. Organization of Vocational Education—Staff (3-0; 0-0)

Ed.Voc. 591. Problems and Trends in Vocational Education (0-0; 3-0)
Staff

Ed.Voc. 594. Research and Development Seminar in Vocational Education—Staff (3-0; 3-0)

LINGUISTIC STUDIES

Graduate programs in linguistic or philological studies centering on a specific language will normally be arranged with and administered by the department most directly concerned. Programs in General Linguistic Studies leading toward an M.A. degree and involving concentration in such fields as general, descriptive and applied linguistics will be arranged with and administered by an Interdepartmental committee comprised of representatives of the Departments of Classics, English, Germanic Languages and General Linguistics, Romance Languages, Slavonic Languages, Sociology and Anthropology, and the Faculty of Education.

Students admitted to a program in General Linguistic Studies must possess as a prerequisite proficiency in two languages other than English. Special cases may be considered by the Committee.

All students will be required to complete an integrated program of study and to submit a thesis based on research in a chosen and approved field of investigation. Full-time attendance at the University for one academic year will also be required.

For additional information regarding such a program, inclusive of the availability of assistantships, scholarships, research grants, etc., students should consult the secretary of the Interdepartmental Committee, c/o Department of Germanic Languages and Linguistics, University of Alberta, Edmonton. Such inquiries should be made as early as possible, particularly by students who wish to begin their program by taking courses in the Summer School of Linguistics.

The following courses, which are at present offered by member departments, may be taken for graduate credit:

Applied Linguistics

Education—

***380. Curriculum and Instruction in the Secondary School (Latin)** (10-0)

*438. Teaching English as a Second Language (10-0)
456. Curriculum and Instruction (English) (3-0; 3-0)
460. Advanced Curriculum and Instruction in Secondary School Foreign Languages (3-0; 3-0)
680. Graduate Seminar on the Teaching of French in the Secondary School (3-0; 3-0)
680. Graduate Seminar on the Teaching of (English) Language and Literature in the Secondary School (3-0; 3-0)

Linguistics—
370. Contrastive Linguistics (French-English) (3-0; 3-0)
405. Applied Linguistics (3-0; 3-0)

Classics

Latin—
504. Greek and Italic Dialects (3-0; 3-0)
506. Sanskrit (3-0; 3-0)
514. Comparative Philology and Syntax (3-0; 3-0)

English

English—
308. Old English Language and Literature (3-0; 3-0)
388. History of the English Language (3-0; 3-0)
*389. Modern English Grammar (10-0)
576. Study of Language (2-0; 2-0)
592. Old Norse and Germanic Philology (3-0; 3-0)
610. Old English (3-0; 3-0)

General Linguistics

Anthropology—
305. Culture and Language (3-0; 3-0)

English—
*387. Linguistic Geography and Lexicography (10-0)

Linguistics—
350. General Linguistics (3-0; 3-0)
*440. Cree Phonology and Structure (10-10)
*450. Eskimo Language and Culture (10-10)
455. Descriptive Linguistics (3-0; 3-0)
465. Historical Linguistics (3-0; 3-0)
470. American Indian Linguistics (3-0; 3-0)
550. Advanced Phonetics and Field Methods (3-0; 3-0)

Germanic Languages

German—
530. Middle High German Literature and Philology (3-0; 3-0)

540. Old High German	(3-0; 3-0)
550. Gothic	(3-0; 0-0)
550. History of the German Language	(0-0; 3-0)
575. Studies in Indo-European	(3-0; 0-0)
580. Comparative German Grammar	(0-0; 3-0)
590. Old Saxon	(0-0; 3-0)
697. Special Topics in Germanic Linguistics and Philology	(3-0; 3-0)

Scandinavian—

550. Old Icelandic Philology	(3-0; 0-0)

Romance Languages

French—

399. Introduction to French Medieval Language and Literature	(3-0; 3-0)
601. History of the French Language	(3-0; 3-0)

Spanish—

540. History of the Spanish Language	(3-0; 3-0)

Slavonic Languages

Russian—

560. History of the Russian Language	(3-0; 3-0)

Slavonics—

520. Old Church Slavonic	(3-0; 3-0)
540. Introduction to Comparative Slavonic Philology	(3-0; 3-0)
545. Seminar in Slavonic Philology	(1-0; 1-0)

*Courses marked with an asterisk are at present available only in the Summer School of Linguistics. Some may be offered only at infrequent intervals.

MATHEMATICS

1. The Mathematics Department can offer postgraduate courses in a number of fields, including number theory, real variable theory, classical analysis, differential equations, tensor analysis, theoretical physics, differential geometry, modern algebra, and mathematical statistics.

2. Several teaching assistantships, involving up to six hours a week of elementary teaching, are available for candidates working towards a higher degree.

3. Courses taken in other departments will depend upon the field of interest of the candidates. Courses in physics may include 480, 470, 520, 510, 550, or 570, or Astronomy 410.

4. Candidates for the M.Sc. degree must satisfy the Department that they have competence in reading one of the following foreign languages: French, German, and Russian.

   Ph.D. candidates must satisfy the Department that they have a reading knowledge in two of French, German, and Russian.

5. The normal M.Sc. degree dequirements for candidates with an Honors Mathe-

matics degree or equivalent may be completed in a minimum of one full year, and consist of a thesis in one of the fields mentioned above, and a minimum of two graduate courses at least one of which must be in the Department of Mathematics.

M.Sc. candidates entering from a pass degree in the Mathematics pattern will require a minimum of two academic years to complete at least six courses and a thesis.

6. Candidates for the Ph.D. degree will spend at least two years from the completion of the M.Sc. degree in advanced study and research. The major requirement is a substantial contribution to knowledge, embodied in a thesis.
7. Prospective students should consult both the head of the department and the staff member in charge of the field in which they are particularly interested.

Mathematical Physics

The Master of Science and Doctor of Philosophy degrees in Mathematical Physics may be taken in the Mathematics department by a student with a good background in both Mathematics and Physics. Candidates with an Honors degree in Mathematics will be required to write a thesis on some topic in the field of theoretical, rather than experimental Physics, or in Applied Mathematics.

The program of graduate courses will be selected in consultation with the heads of the departments of Mathematics and Physics.

Candidates who have a B.Sc in the Mathematics pattern of the general course, with three or more courses in Physics, may be accepted for a two-year M.Sc. program in Mathematical Physics. The general conditions of paragraph five above will apply.

Statistics

The Master of Science and Doctor of Philosophy degrees in Mathematical Statistics may be taken in the Mathematics department.

Candidates for the M.Sc. degree with an Honors degree in Mathematics will be required to take at least two graduate courses in theoretical statistics and to write a thesis on some topic in this field.

Candidates with a B.Sc. in the Mathematics pattern of the general course may be accepted for a two-year M.Sc. program if their pattern has included Mathematics 255, and Mathematics 450 or their equivalent. The general conditions of paragraph five above will apply.

Honors and Graduate Courses

A selection of courses, depending on demand, will be made from the following list:

Mathematics

500. Theory of Functions of a Complex Variable	(3-0; 3-0)
501. Theory of Functions of a Complex Variable	(3-0; 3-0)
502. History of Mathematics	(2-0; 2-0)
510. Modern Algebra	(3-0; 3-0)
515. Number Theory	(3-0; 3-0)
520. Differential Geometry	(3-0; 3-0)
540. Theory of Functions of a Real Variable	(3-0; 3-0)
550. Generalized Dynamics and Special Relativity Theory	(3-0; 3-0)

555. Hydro- and Aero-dynamics	(3-0; 3-0)
580. Tensor Analysis	(3-0; 3-0)
600. Analysis. Special Functions	(3-0; 3-0)
604. Measure Theory	(3-0; 3-0)
605. Mathematical Logic	(2-0; 2-0)
610. Calculus of Finite Differences	(3-0; 3-0)
615. Integral Equations	(3-0; 3-0)
616. Topics in Functional Analysis	(3-0; 3-0)
620. Advanced Complex Analysis	(3-0; 3-0)
621. Ordinary Differential Equations (Advanced)	(3-0; 3-0)
625. Analytic Number Theory	(3-0; 3-0)
630. Topology	(3-0; 3-0)
645. Lattice Theory	(3-0; 3-0)
670. Topics in Algebra	(3-0; 3-0)
671. Topics in Analysis	(3-0; 3-0)
672. Topics in Geometry	(3-0; 3-0)
673. Topics in Applied Mathematics	(3-0; 3-0)
680. Advanced Quantum Mechanics	(3-0; 3-0)
682. Advanced Electromagnetic Theory	(3-0; 3-0)
685. Advanced Statistical Mechanics	(3-0; 3-0)
688. Advanced Solid State Theory	(3-0; 3-0)
690. Advanced Field Theory	(3-0; 3-0)
692. Applications of Group Theory	(3-0; 3-0)
695. Advanced Relativity Theory	(3-0; 3-0)
697. Nuclear Structure	(3-0; 3-0)
699. Selected Topics in Theoretical Physics	(2-0; 2-0)

Statistics

560. Estimation and Statistical Hypotheses	(3-0; 3-0)
562. Theory of Games	(2-0; 2-0)
564. Analysis of Variance	(3-0; 3-0)
565. Mathematical Methods of Statistics	(2-0; 3-0)
570. Probability Theory and Applications	(2-0; 2-0)
660. Stochastic Processes	(2-0; 2-0)
674. Topics in Statistics	(3-0; 3-0)

MECHANICAL ENGINEERING

1. Programs and facilities are available for qualified graduates of recognized universities to carry out graduate study and research in Applied Mechanics, Thermodynamics, Heat Transfer and Combustion Engineering leading to an M.Sc. degree. Facilities and research opportunities are also available to well qualified students to carry out a program leading to a Ph. D. in Applied Mechanics. Individual programs will be arranged in consultation with the Head of the Department and

an advisory committee selected from the Department.

2. The normal requirements for a Master's degree are credit in courses equivalent to 24 term hours, 12 of which must be in the candidate's major field, plus a thesis equivalent to 12 term hours.
3. For the Ph.D. program, all requirements of the Faculty of Graduate Studies must be met. In addition the Department normally requires that the candidate must have satisfactorily completed approved courses in the major and in at least one minor field. The minimum requirements after the Bachelor's Degree are courses equivalent to 24 term hours in the major field and 12 term hours in a single minor field or a total of 14 term hours in two minor fields. As part of the requirements for demonstrating competence for admission to candidacy for the Ph.D. the students must pass the departmental comprehensive examinations embracing the major and minor fields. These examinations may be either written or oral. The examinations will be arranged for in consultation with the Department, but will generally not be permitted until the student has completed one year of graduate work and has satisfied one of the foreign language requirements.
4. To the limit of its facilities the Department is prepared to accept qualified graduates from recognized universities. Graduates from fields other than Mechanical Engineering may be accepted under special arrangement.
5. Financial assistance is available through part-time teaching assistantships. Limited travel grants are available to teaching assistants. The student should also note the availability of various scholarships listed under Awards and Financial Assistance.
6. *Graduate Courses*

Engineering Mechanics—

551. Theory of Elasticity	(3-0; 0-0)
552. Dynamics of Structures	(0-0; 3-0)
554. Theory of Elastic Stability	(0-0; 3-0)
555. Theory of Plasticity	(3-0; 3-0)
556. Theory of Plates	(3-0; 0-0)
557. Theory of Shells	(0-0; 3-0)

600-604. Reading Projects in Engineering Mechanics
Max. of 6 hrs credit in any project

Mechanical Engineering—

520. Advanced Combustion Engineering	(2-3/2; 0-0)
521. Advanced Combustion Engineering (Design)	(0-0; 2-3/2)
535. Gas Dynamics I	(3-0; 0-0)
536. Gas Dynamics II	(0-0; 3-0)
540. Thermodynamics III	(3-0; 3-0)
570. Conduction Heat Transfer	(3-0; 0-0)
572. Convective Heat Transfer	(0-0; 3-0)
575. Thermal Radiation	(0-0; 3-0)

MEDICINE AND CLINICAL MEDICINE

There are facilities in the Department of Medicine to permit graduate students to proceed to Master of Science degrees. Fellowships are available on an annual basis for suitable candidates. Information on this subject can be obtained by applying to the Head of the Department.

MINING AND METALLURGY

The Department of Mining and Metallurgy offers graduate work in the fields of Mineral Dressing, Hydrometallurgy, Pyrometallurgy and Physical Metallurgy. Graduate programs in these fields, leading to the degrees of M.Sc. and Ph.D. in Metallurgy, M.Sc. and Ph.D. in Metallurgical Engineering, may be arranged.

Graduates in the basic Sciences or Engineering are eligible to apply.

The Department in recent years has acquired new and enlarged space facilities and much new and specialized equipment has been added.

Fields of interest include a variety of projects in both Physical and Extractive Metallurgy.

Graduate courses offered in the Department are as follows:

Metallurgical Engineering—

500. Metallurgical Thermodynamics

501. Kinetics of Metallurgical Processes

502. Advanced Crystallography

***503. Corrosion**

504. Flotation

505. Hydrometallurgy

506. Research Techniques in Metallurgy

NOTE: The Department reserves the right to offer only those graduate courses for which a sufficient number of students register.

---

*A course in chemical thermodynamics and a course in physical metallurgy are prerequisites for Met.E. 503 (Corrosion).

PAEDIATRICS

Facilities exist within the Department of Paediatrics for students who wish to proceed to the M.Sc. Degree.

Inquiries should be directed to the Head of the Department of Paediatrics, University Hospital.

PATHOLOGY

1. Facilities are available for graduate training and research leading to the M.Sc. degree in Medical Laboratory Science.
2. The M.Sc. program can be entered by graduates of the B.Sc. course in Medical Laboratory Science and certain other B.Sc. graduates in which case the period before submission of the thesis will normally be two years, and by graduates in Medicine, in which case the period will normally be twelve months. Programs will include graduate courses, seminars, and pursuit of an approved research problem.

3. Courses prerequisite for the M.Sc. program can be specified only at the time of arrangement of the candidate's program, although some biological sciences, particularly Microbiology, Biochemistry and Physiology should have been studied.
4. Graduate and undergraduate courses offered by the Departments of Anatomy, Biochemistry, Physiology, Pharmacology and Plant Science may be included in the candidate's program. Courses offered by other departments or faculties may be approved under certain circumstances.
5. *Graduate Courses*

501. Cellular and Tissue Structure and General Mechanisms of Disease—Staff (3-2; 3-2)

502. Reticuloendothelial System and Immunity—G. O. Bain (3-0; 0-0)

503. Advanced Hematology—R. E. Bell and Staff (0-0; 3-0)

504. Seminars on General Pathology—Staff (1-0; 0-0)

505. Fundamentals of Histochemistry—T. K. Shnitka (1-2; 0-0)

610. Subcellular Morphology—T. K. Shnitka (0-0; 2-0)

NOTE: Not all graduate courses are offered every year. The head of the Department should be consulted regarding the availability of graduate courses in any academic session.

PHARMACOLOGY

1. Facilities are available for graduate training in research leading to the M.Sc. and Ph.D. degrees. The staff of the Department are orientated towards experimental pharmacology with emphasis on both physiological and biochemical approaches to the pharmacology of smooth muscle, and the nervous and cardiovascular system. Techniques available include electrophysiological recording, radioactive tracers, spectrophotometric assays, photofluorometric assays, isolation of cell fractions and chemical syntheses. In addition, training in Clinical Pharmacology is offered in conjunction with the Department of Medicine and the University Hospital.
2. A program has been arranged for graduates in Medicine wishing to spend a year in a basic science department. The program includes graduate courses, a weekly seminar, duties as class laboratory demonstrator, participation in a research project and optional attendance at undergraduate lectures. This training does not lead to a degree, but may satisfy some of the course requirements for an M.Sc. should the candidate decide to undertake a research propect leading to a thesis. Students not intending to proceed to a graduate degree should register as special students in the Faculty of Medicine.
3. Graduate studies in Pharmacology may be of interest to candidates with degrees in general biology, psychology, physics, chemistry, biochemistry, physiology, bacteriology, pharmacy, medicine and dentistry. Prerequisite courses will be specified at the time of arrangement of the candidate's program. The time required for completion of graduate programs will vary with previous training of the individual and will ordinarily be less for those entering with an honors degree or a degree in Medicine or Dentistry.
4. Graduate and undergraduate courses offered by other departments may be in-

cluded in a candidate's program by arrangement between the departments concerned.

5. Financial support of the candidate can be arranged. Teaching and Research Fellowships are available to graduate students; applications for these should be received before March 15 of each year.

6. *Graduate Courses*

501. Tutorial and Reading Course—Staff (Credit 4 hrs.)

502. Methodology in Pharmacology—Staff (0-3; 0-3)

***503. Bioassays**—C. W. Nash and J. D. Taylor (0-0; 1-6)

***504. Pharmacological Aspects of Autonomic Transmittor Substances**—C. W. Nash and J. D. Taylor (0-0; 3-0)

***505. The Relationship Between Chemical Structure and Pharmacological Activity**—G. S. Marks (0-0; 3-0)

***600. Seminar**—Staff and graduate students (0-0; 1s-0)

601. The Actions of Drugs on Membrane Potentials and Ion Fluxes of Smooth Muscle—E. E. Daniel (0-0; 3-0)

†**602. Research Methods in Clinical Pharmacology**—W. A. Mahon (0-4; 0-4)

---

*Given every other year.

†Only students with the M.D. degree can be accepted in this course.

PHARMACY

1. The Faculty of Pharmacy offers programs leading to the M.Sc. and Ph.D. degrees and can accommodate a limited number of graduate students in modern well-equipped laboratories.

2. Research may be undertaken in fields such as pharmaceutical chemistry, pharmacology, pharmacognosy, pharmaceutics and biochemical studies with radioactive tracers. Financial assistance is available from the Canadian Foundation for the Advancement of Pharmacy, and from other sources.

3. Candidates should consult with the Dean regarding the requirements. Individuals with backgrounds in such fields as Pharmacy, Biological Science or Chemistry will be considered.

4. Undergraduate courses commonly accepted: Biochemistry 400, Botany 310, Chemistry 430, 450, 372, 370

5. *Graduate Courses*

501. Isotope Tracer Methodology—B. E. Riedel (3-3; 0-0)

502. Radioisotopes—B. E. Riedel (0-0; 3-3)

503. Medical Application of Radioisotopes—B. E. Riedel (0-0; 3-3)

504. Structure-Action Relationships of Organic Medicinals (3-0; 0-0)
L. G. Chatten

506. Graduate Seminar (1s-0; 1s-0)

PHILOSOPHY

1. The Department offers programs leading to the M.A. and Ph.D. degrees.
2. Good library facilities are available for the fields shown below.

3. Advanced work may be pursued in any of the following: Ethics, Aesthetics, Social Philosophy, History of Philosophy, Logic and Scientific Method. Graduate students in these fields may compete for the general graduate scholarships listed elsewhere; small sums are also available within the Department for readers.
4. Applicants for the one-year M.A. program in Philosophy must have completed training equivalent to that of graduates with honors in Philosophy from this Department. Applicants for the two-year M.A. program should consult the Department for assessment of the quantity and quality of their undergraduate training in philosophy.
5. *Graduate Courses*

502. Plato
504. Aristotle
506. St. Thomas Aquinas
510. Hegel
512. Marx and Marxism
514. Kierkegaard
516. Wittgenstein
522. Moral Philosophy
524. Political and Social Philosophy
526. Philosophy of Art
528. Philosophy of History
536. Contemporary Phenomenology
548. Conference Course
556. Kant
558. Philosophy of Religion
560. Logic
566. Theory of Knowledge
568. Philosophy of Mind
570. Philosophy of Language
574. Seminar in Philosophy and Psychology

PHYSICAL EDUCATION

1. The Faculty of Physical Education offers a program leading to the M.A. or M.Sc. degrees. Well equipped facilities are available for a limited number of graduate students.
2. Areas of specialization include: physiology of exercise, sociology, psychology of motor learning, and history.
3. Teaching assistantships are available to a limited number of students.
4. All arrangements must be made through consultation with the Dean of the Faculty of Physical Education.
5. *Graduate Courses*

Physical Education—

544. Current Problems in Physical Education and Recreation (3-0; 3-0)

548. Scientific Principles of Physical Education (3-0; 3-0)

552. Administration of Recreation (3-0; 3-0)

577. Research Methods in Health, Physical Education and Recreation (3-3; 3-3)

PHYSICS

1. Programs leading to the M.Sc. and Ph.D. degrees in Physics are open to suitable graduates in Honors Physics, Engineering Physics, or equivalent courses. Individual programs will be arranged in consultation with the Head of the Department of Physics and members of the department. Programs can be arranged both in Edmonton and in Calgary.
2. The minimum requirements for the M.Sc. degree are one full year of study and research beyond the level of the Honors B.Sc. degree in Physics. Candidates with deficiencies in this respect will be required to remedy these, and may be required to take a winter session of courses before commencing their research. All M.Sc. candidates will be required to write a comprehensive examination shortly before registration time for the purpose of having their background assessed and remedied if necessary. The program will include a minimum of two graduate courses and a research project of sufficient merit to form the basis of a thesis.
3. The minimum requirements for the Ph.D. degree are two full years of study and research beyond the level of the M.Sc. degree in Physics or in Theoretical Physics. The program will include a minimum of two courses and a thesis based on original research. A reading knowledge of German or Russian will be required.

   In addition to the examinations required by the general regulations, a preliminary oral examination will be required between 6 and 12 months after starting work at this university, or after completing the M.Sc., as the case may be.
4. *Theoretical Physics.* The major fields of theoretical research are: Solid state physics, physical acoustics, theoretical nuclear physics, elementary particles, field theory. An IBM 7040 plus ancillary equipment is available for computational work.
5. *Experimental Physics.* Research projects are available in the following fields: nuclear physics (with a 6-Mev Van de Graaff generator), low temperature and solid state physics, geophysics, mass specrtometry, precision optical spectroscopy, radiation and medical physics.
6. A number of half-time teaching assistantships are available for graduate students who have no other financial assistance. The stipends vary from $2,100 to $2,700. Inquiries concerning assistantships should be addressed to the Head of the Department.

   In addition to the above, summer student assistantships to the value of $1,000 are available in most research projects. The attention of students is directed to the availability of the various graduate awards listed under "Awards and Financial Assistance".
7. The following undergraduate courses are offered regularly, and are available to graduate students in other departments and to students in the two-year M.Sc. program: Physics 440, 470, 480, 510, 520, 550.
8. *Graduate Courses*

516. Solid State Physics—F. L. Weichman (2-0; 2-0)

540. Advanced Electronics (2-0; 2-0)

560. Physical Optics—K. B. Newbound (3-0; 3-0)

570. Quantum Mechanics—B. V. Paranjape (3-0; 3-0)

572. Nuclear Physics—G. C. Neilson (2-0; 2-0)

574. Radiation Physics (3-0; 3-0)

600. Seminar in Advanced Topics (0-1s; 0-1s)
Weekly seminars are held in each of the following fields: Theoretical Physics, Nuclear Physics, Solid State Physics, Geophysics, of which the student must select one series.

616. Low Temperature Physics—F. D. Manchester (2-0; 2-0)

620. Advanced Problems in Geophysical Exploration (2-0; 2-0)

622. Advanced Earth Physics (2-0; 2-0)

660. Atomic Theory and Spectroscopy—K. B. Newbound (2-0; 2-0)

662. Molecular Spectroscopy—H. R. Krouse (2-0; 2-0)

672. Advanced Nuclear Physics—H. W. Taylor (3-0; 3-0)

680. Advanced Quantum Mechanics—D. D. Betts (3-0; 3-0)

682. Advanced Electromagnetic Theory—H. Schiff (3-0; 3-0)

685. Advanced Statistical Mechanics—S. N. Bagchi (3-0; 3-0)

688. Advanced Course in Theories of the Solid State (3-0; 3-0)
A. B. Bhatia

690. Advanced Field Theory (3-0; 3-0)

692. Applications of Group Theory (3-0; 3-0)

695. Advanced Relativity Theory—M. Wyman (3-0; 3-0)

697. Nuclear Structure (3-0; 3-0)

699. Selected Topics in Theoretical Physics (2-0; 2-0)

PHYSIOLOGY

1. Facilities are available for graduate training and research leading to the M.Sc. degree. The laboratory is adequately equipped for work in the fields of cardiovascular physiology, neurophysiology, temperature regulation, haematology and certain aspects of biophysics, endocrine, respiratory and cellular physiology. A research program leading to the Ph.D. degree can also be provided in certain of these fields.
2. A program has been arranged for graduates in Medicine wishing to spend a year in a basic science department. The program includes graduate courses, a weekly seminar, duties as class laboratory demonstrator, participation in a research project and optional attendance at undergraduate lectures. This training does not lead to a degree, but may satisfy some of the course requirements for an M.Sc. should the candidate later decide to undertake a research project leading to a thesis.
3. The M.Sc. program can be entered by graduates in Arts and Science, in which case the period before submission of the thesis will normally be two years,

and by graduates in Medicine or Dentistry, in which case the period will normally be twelve months. In either case a comprehensive knowledge of the elements of physiology must be demonstrated before submission of the thesis. A program will include graduate courses, participation in a weekly seminar, a limited amount of teaching experience, optional attendance at undergraduate lectures and pursuit of an approved research problem.

4. Prerequisite courses can be specified only at the time of arrangement of the candidate's program, although some biological sciences should have been studied. The requisites of prime importance are a good academic standing and a desire to study biological function.
5. A modest financial support of a candidate can usually be arranged, and this is aided by early application by the student.
6. Graduate and undergraduate courses offered by the Departments of Anatomy, Biochemistry, Chemistry, Pathology, Pharmacology, Physics and Zoology may be included in the candidate's program.
7. Four Teaching Assistantships are available to graduate students; applications for these should be received before March 15 of each year.
8. *Graduate Courses*

501. Reflex activity of the cardiovascular system* (0-0; 3-0)
J. W. Pearce

502. Methodology in physiology—Staff (0-3; 0-3)

503. Cellular Neurophysiology* (0-0; 3-0)
K. M. Chapman

504. Physiology of the adrenal cortex and the gonads* (0-3; 0-0)
E. O. Höhn

505. Advanced physiological techniques*—C. Heath and Staff (0-0; 1-6)

506. Tutorial and reading course—Staff (1-3; 0-0)

507. Physiology of temperature regulation*—W. H. Cottle (0-0; 3-0)

600. Seminar—Staff (1s-0; 1s-0)

*Offered every second year.

PLANT SCIENCE

1. The Department offers programs of course work and research leading to the M.Sc. or Ph.D. degrees. Well equipped laboratory accommodation, greenhouse, growth chamber and field facilities are available for work in crop ecology, horticulture, plant pathology, and plant physiology and biochemistry.
2. Research in the above divisions of the department concerns weeds and weed control, plant growth regulators, grassland improvement; various aspects of production of horticultural crops and ornamentals; host-pathogen relationships and protection against plant disease organisms; protein biochemistry, quality of cereals and of oil-seeds, plant morphogenesis.

Financial assistance from research grants is available for a number of qualified candidates.

3. Graduate students are not required to qualify in a foreign language during preparation for the Master's degree but must do so for the doctorate.
4. Normally all relevant senior undergraduate courses are acceptable as part of the graduate program. Course requirements are based on the student's previous training and anticipated needs in the chosen field of advanced study.
5. *Graduate Courses*

Plant Science—

500. Seminar in Plant Science (1s-0; 1s-0)

Horticulture—

507. Reading Projects in Horticulture—Staff Max. of 6 hrs. credit

508. Research Projects in Horticulture—Staff Max. of 6 hrs. credit

Plant Pathology—

511. Reading Projects in Plant Pathology Max. of 6 hrs. credit
Staff

512. Research Projects in Plant Pathology Max. of 6 hrs. credit
Staff

631. Advanced Plant Pathology (0-3; 0-3)
Staff

Plant Physiology and Biochemistry—

513. Reading Projects in Plant Physiology and Biochemistry—A. G. McCalla and Saul Zalik Max. of 6 hrs credit

514. Research Projects in Plant Physiology and Biochemistry—A. G. McCalla and Saul Zalik Max. of 6 hrs credit

551. Advanced Plant Biochemistry (3-0; 0-0) or (0-0; 3-0)
Mary Spencer and E. Cossins

Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and of methods of investigation in these fields.

Prerequisites: Biochemistry 300, or Plant Physiology and Biochemistry 431 432 or consent of instructor.

(This course is identical to Plant Physiology and Biochemistry 551

620. Plant Morphogenesis—Saul Zalik (2-2; 2-2)

Weed Science—

501. Reading Projects in Weed Science Max. of 6 hrs. credit
Wm. G. Corns and Wm. H. Vanden Born

502. Research Projects in Weed Science Max. of. 6 hrs. credit
Wm. G. Corns and Wm. H. Vanden Born

POLITICAL ECONOMY

1. Graduate work in the department may be undertaken in either Economics or Political Science.
2. The department offers programs in Economics and Political Science leading to the M.A. and Ph.D. degrees.

3. A number of graduate assistantships are available for qualified students.
4. Students contemplating graduate work in either Economics or Political Science should direct their inquiries to the Head of the Department.
5. *Graduate Courses*

Economics—

501. Economic Analysis	(3s-0; 3s-0)
502. A General Reading and Seminar Course	(3s-0; 3s-0)
504. Econometrics—W. Hague	(3s-0; 3s-0)
506. Mathematical Economics—W. Hague	(3s-0; 3s-0)
510. Economics of Underdeveloped Countries—Z. Konczacki	(3s-0; 3s-0)
511. Economic Development of Canada	(3s-0; 3s-0)
560. Agriculture in Developing Countries—E. Berg	(3s-0; 3s-0)
593. Seminar in Slavonic and Soviet Studies An Interdepartmental Seminar.	(3s-0; 3s-0)
600. Advanced Micro-Economic Analysis D. Winch and J. Delehanty	(3s-0; 3s-0)
604. Advanced Econometrics and Mathematical Economics W. Hague	(3s-0; 3s-0)
611. Economic Development	(3s-0; 3s-0)
621. International Economics—T. L. Powrie	(3s-0; 3s-0)
631. Labor Problems	(3s-0; 3s-0)
641. Monetary Theory and Policy—M. Bauer	(3s-0; 3s-0)
651. Public Finance and Fiscal Theory—E. J. Hanson	(3s-0; 3s-0)
653. Transportation and Public Utilities—E. J. Hanson	(3s-0; 3s-0)
661. Agricultural Economics—E. Berg	(3s-0; 3s-0)
671. Business and Government Members of the Department	(3s-0; 3s-0)
680. Advanced Macro-Economic Analysis—W. D. Gainer	(3s-0; 3s-0)
691. Comparative Economic Systems—I. Moravcik	(3s-0; 3s-0)
692. The Soviet Economy—I. Moravcik	(3s-0; 3s-0)

Political Science—

501. Comparative Political Institutions	(3s-0; 3s-0)
510. Advanced Political Thought	(3s-0; 3s-0)
541. Seminar in Soviet Politics	(3s-0; 3s-0)
543. Seminar in Slavonic and Soviet Studies	(3s-0; 3s-0)
593. Political Behavior	(3s-0; 3s-0)
600. Political Institutions	(3s-0; 3s-0)
605. Systematic Study of Politics	(3s-0; 3s-0)
610. Political Theory	(3s-0; 3s-0)
613. Seminar in Soviet Political Theory	(3s-0; 3s-0)
621. Government of Canada	(3s-0; 3s-0)

641. Research in Soviet Government (3s-0; 3s-0)
651. Public Administration (3s-0; 3s-0)
660. Theories of International Politics (3s-0; 3s-0)
661. International Politics (3s-0; 3s-0)
663. Problems of International Organization: Political and Security (3s-0; 3s-0)
665. Problems of International Organization: Economic and Social (3s-0; 3s-0)
673. Government and Politics in South and East Asia (3s-0; 3s-0)
690. Political Behavior (3s-0; 3s-0)

PSYCHOLOGY

1. The Department offers graduate work leading to the M.A., M.Sc., and Ph.D. degrees.

2. Requirements for the Master's degree include the demonstration of competence in:
   (a) *Core Courses*—
      (1) Psychology 502, History and Systems of Psychology
      (2) Psychology 530, Research Design I
      (3) Psychology 531, Research Design II
      (4) Psychology 560, Advanced Experimental Psychology
      (5) Psychology 583, Personality-Social
   (b) *One of the Following Areas of Specialization*—clinical, comparative and physiological, general experimental, industrial, learning, methodology, personality, psychometrics, psychopathology, sensation and perception, social, theoretical.

3. Requirements for the Ph.D. include the demonstration of competence in:
   (a) *Master's Level Core Courses Listed Above.*
   (b) *One of the Following Areas of Specialization*—
      (1) theoretical-experimental
      (2) quantitative-psychometrics
      (3) personality-psychopathology
      (4) clinical research
      (5) social psychology

   The intensity of depth as opposed to the extent of breadth within a given option can vary somewhat in accordance with research interests and an individual program as determined in consultation with the Department.

4. The instructional and research facilities include laboratories for human and animal experimentation, a departmental equipment room and shop, a departmental clinic, cubicles for individual psychological testing, interviewing and counselling, and practicum arrangements with local hospitals and industry. In addition, the department receives technical assistance from the university computing centre and the electronic instrumentation shop.

5. Several half-time graduate assistantships, involving teaching or research or both, are available to outstanding applicants. The stipends vary from $1,800 to $3,000 plus a travel grant up to $250. Initial inquiries concerning these and other

Graduate Awards should be addressed to the Dean of the Faculty of Graduate Studies. Completed applications should be forwarded to the Chairman, Graduate Students Selection Committee, Department of Psychology.

6. In addition to the above, summer research assistantships to the value of $1,000 are available in most currently active staff research projects.

7. *Graduate Courses*

501. Honors Seminar	(3-0; 3-0)
502. History and Systems of Psychology	(3-0; 3-0)
504. Conference Course in Psychology	(Arranged)
520. Seminar in Industrial Psychology	(3s-0; 3s-0)
528. Advanced Psychometric Theory	(3-1; 3-1)
530. and 531. Research Design I and II	(3-1; 3-1)
536. Clinical Psychometrics	(3-3; 3-3)
538. Advanced Clinical Psychometrics	(3-3; 3-3)
540. Seminar in Social Psychology	(3s-0; 3s-0)
550. Experimental Analysis of Personality	(3-0; 0-0) or (0-0; 3-0)
560. Advanced Experimental Psychology	(3-3; 3-3)
565. Seminar in Learning Theory	(3-0; 0-0)
570. Drugs and Behavior	(3-0; 0-0) or (0-0; 3-0)
574. Seminar in Philosophy and Psychology	(2s-0; 2s-0)
575. Advanced Physiological Psychology	(3-3; 3-3)
578. Experimental Psychopathology	(3-0; 0-0) or (0-0; 3-0)
583. Personality-Social	(3-0; 3-0)
584. Seminar in Personality Theory	(3s-0; 3s-0)
585. Seminar in Theories of Perception	
588. Advanced Abnormal Psychology	(3-0; 3-0)
590. Clinical Psychology and Therapy	(3-3; 3-3)
599. Honors Thesis	(3-3; 3-3)
600. Research Seminar	(2s-0; 2s-0)
648. Research	(3-3; 0-0)
649. Research	(0-0; 3-3)
698. Advanced Research	(3-3; 0-0)
699. Advanced Research	(0-0; 3-3)

RADIOLOGY

Facilities exist within the Department of Radiology, University Hospital and University of Alberta for students who wish to proceed to the M.Sc. degree in any of the following fields:

1. Clinical Radiation Biology
2. Radiologic Physics
3. Health Physics

Program in Radiation Physics may be arranged in co-operation with the Physics Department, University of Alberta and the Department of Radiology.

Inquiries should be directed to the Head of the Department of Radiology, University Hospital, Edmonton.

ROMANCE LANGUAGES

1. Graduate work leading to the M.A. or Ph.D. may be undertaken in many areas of Romance languages and literatures, or of comparative literature.
2. Prospective candidates should direct their enquiries to the Head of the Department. Individual programs will be arranged in consultation with members of the Department.
3. Assistantships are normally available in French and Spanish.
4. *Graduate courses*

French—

510. Seminar in French Composition—M. Faucher (3-0; 3-0)
600. French Medieval Literature—H. S. Robertson (3-0; 3-0)
601. History of the French Language—H. S. Robertson (3-0; 3-0)
610. The Renaissance—C. H. Moore and M. Faucher (3-0; 3-0)
612. The Spirit of Humanism in France and England at the Beginning of the Renaissance—I. Sowton and C. H. Moore (3-0; 3-0)
614. Rabelais—C. H. Moore (3-0; 3-0)
616. Ronsard—C. H. Moore (3-0; 3-0)
618. Montaigne—M. Faucher (3-0; 3-0)
620. The French Moralists—M. Faucher (3-0; 3-0)
625. Molière—M. Faucher (3-0; 3-0)
630. The Eighteenth Century Novel—E. J. H. Greene (3-0; 3-0)
634. Marivaux—E. J. H. Greene (3-0; 3-0)
636. Voltaire— E. J. H. Greene and C. H. Moore (3-0; 3-0)
638. Rousseau—E. J. H. Greene (3-0; 3-0)
645. Stendhal—M. Faucher (3-0; 3-0)
648. Literature and the Plastic Arts from the Time of Delacroix and Baudelaire—M. Faucher (3-0; 3-0)
650. Maupassant—C. H. Moore (3-0; 3-0)
651. The Naturalistic Novel—C. H. Moore (3-0; 3-0)
655. The Late Nineteenth Century Theatre—C. H. Moore
665. Valéry (3-0; 3-0)
670. Proust—M. Faucher (3-0; 3-0)
699. Conference Course—E. J. H. Greene, M. Faucher, C. H. Moore

Spanish—

540. History of the Spanish Language (3-0; 3-0)
550. Medieval Narrative Poetry—J. Ferraté (3-0; 3-0)

570. Galdós and His Contemporaries—J Ferraté (3-0; 3-0)

580. Contemporary Spanish and Hispano-American Poetry (3-0; 3-0)
J. Ferraté

590. Modern Spanish and Hispano-American Novelists (3-0; 3-0)
J. Ferraté

605. Medieval Spanish Prose—J. Ferraté (3-0; 3-0)

625. Spanish Baroque Poetry—J Ferraté (3-0; 3-0)

SECONDARY EDUCATION

1. The Department of Secondary Education offers programs leading to the M.Ed., Ph.D. and Ed.D. degrees.
2. The work of this Department is closely coordinated with that of other Departments in the Faculty of Education and with other faculties and schools of the University.
3. Graduate programs in Secondary Education normally include both professional courses in education and senior or graduate courses offered by other faculties and schools in the University. Advanced Curriculum and Instruction courses in most of the traditional fields of study are offered by the Department of Secondary Education.
4. Before a student can be admitted as a candidate for the M.Ed. or higher degree, his record must be acceptable to the Faculty of Graduate Studies and to the Department. The prospective candidate should first consult the Head of the Department of Secondary Education who, together with other members of the staff, will plan an appropriate program.
5. Full-time attendance for a minimum period of one academic year at the University is required for the M.Ed. degree in Secondary Education.
6. A number of assistantships are available to well qualified candidates for the M.Ed. or Ph.D. in Secondary Education.
7. *Graduate Courses*

Ed. CI 550. Secondary Education Seminar—Staff

Ed. CI 580. Curriculum Development (3-0; 3-0)
W. H. Worth and L. W. Downey

Ed. CI 680. Teaching in the Secondary School—Staff (Max. of 6 hours)

SLAVONIC LANGUAGES AND LITERATURE

1. The Department offers programs of course work and research leading to the degree of M.A. in Russian, in Slavonic languages and literatures (Russian, Ukrainian, Polish, Church Slavonic), and in Slavonic and Soviet Studies, with Russian language and literature serving as the core.
2. A modern Language Laboratory and large collections of slides, records and other audio-visual aids offer supplementary facilities for an intensive training in Slavonic languages.
3. A rapidly expanding collection of books, periodicals, documents and microfilms in the Cameron Research Library offers adequate facilities for our M.A. programs. Of special interest is our R. R. Gonsett Collection.

4. Information regarding assistantships and other forms of financial assistance currently available to students registered in programs for the M.A. degree in the department will be supplied upon request; address inquiries to the head of the department.

5. *Graduate Courses*

Russian—

510. Advanced Russian Composition (3-0; 3-0)

550. The Russian Psychological Novel (3-0; 3-0)

560. History of the Russian Language (3-0; 3-0)

570. Soviet Russian Literature (3-0; 3-0)

640. Russian Poetry of the Eighteenth and Nineteenth Centuries (3-0; 3-0)

699. Conference Course
This is an honors or graduate course to meet the needs of individual students. It will consist of a detailed study of some great author or literary problem, directed reading and discussion.

Slavonic Languages and Literature—

520. Old Church Slavonic (3-0; 3-0)

540. Introduction to Comparative Slavonic Philology (3-0; 3-0)

545. Seminar in Slavonic Philology (1-0; 1-0)

580. Slavonic and Soviet Studies: an interdisciplinary Seminar (3-0; 3-0)

600. Early Eastern Slavonic Literature (3-0; 3-0)

620. Comparative Slavonic Literature (3-0; 3-0)

680. Slavonic Civilization (3-0; 3-0)

SOCIOLOGY

1. Fields of specialization presently available for M.A. work in Sociology are: social theory, social psychology, family, community, minority group relations, population and social problems.

2. Several teaching assistantships are available to prospective M.A. candidates. In addition, graduate students may compete for the general graduate scholarships listed elsewhere. Opportunities for research in connection with the thesis, as well as in connection with classwork, are available in the community.

3. In addition to the general requirements for the M.A. degree set forth by the Faculty of Graduate Studies, all applicants for the M.A. in Sociology must:
   (a) Present a good reading knowledge of a language other than English (either French, German, Russian or Spanish) or a course in statistics, and
   (b) Pass a comprehensive examination on the general field of Sociology towards the end of their graduate work.

4. Senior courses in Sociology and in related fields may be included in the graduate program upon recommendation of the Department of Sociology.

5. *Graduate Courses*

502. Conference Course—Staff
510. Research Seminar—Staff
520. Seminar in Social and Personal Disorganization—Staff
526. Seminar in Criminological Theory—R. Laskin, G. Nettler
527. Seminar in Correctional Theory—G. Nettler, R. Laskin
530. Seminar in Sociological Theory—S. Taylor
536. Seminar in Sociology of Knowledge—J. T. Borhek
540. Seminar in Social Psychology—G. Hirabayashi, G. Nettler
542. Small Group Behavior—G. Hirabayashi
550. Seminar in the Human Community—W. Kalbach, C. Hynam
555. Seminar in Demography—W. Kalbach
560. Seminar in Social Organization—C. Hobart, J. T. Borhek
562. Seminar in Social Class—H. Parker
570. Seminar in the Family—C. Hobart
590. Seminar in Industrial Sociology—Staff

SOIL SCIENCE

1. The Department of Soil Science has special research laboratories and facilities in the Agriculture Building and adjacent greenhouses for each of the fields of interest listed below. A full line of modern research equipment is available.

   The Alberta Soil Survey occupies quarters in the same building and graduate students have an opportunity to broaden their knowledge by association with the Soil Survey staff.

   The Department has plots on Black soil at Ellerslie and on Grey Wooded soil at Breton for field tests, and carries on co-operative fertilizer experiments with farmers over a wide area. A complete line of field equipment is available for plot work with cereal and forage crops.

2. Special fields of interest: soil genesis and classification; soil physics; soil chemistry; soil colloids; soil organic matter; soil microbiology; soil fertility; soil testing. Receiving special attention at present are the following:
   (a) Problems in pedogenesis: mineral and organic composition, weathering, leaching, clay characteristics, cation exchange.
   (b) Soil temperature and soil moisture studies.
   (c) Chemical studies of Solonetzic (hardpan) soils.
   (d) Soil fertility and plant nutrition problems: fertilizer and rotation studies, soil deterioration under cultivation, phosphorus availability, and alfalfa-stand problems.
   (e) Soil nitrogen transformations, including fixation, mineralization and immobilization, and denitrification.
   (f) Mobility of ions in soil solutions.
   (g) Soil testing: correlation of soil test values with responses to fertilizer.

3. Graduate students who have the necessary training may take work leading to the

degree of M.Sc. in Soil Science. Exceptionally well qualified graduates may be considered further as candidates for the Ph.D. degree.

Grants, bursaries, and assistantships are available for research from the National Research Council, the Province of Alberta, and industries interested in crop production and the use of fertilizers. Prospective students are invited to direct their inquiries about opportunities for research in specific fields and possibilities of financial assistance to the head of the Department of Soil Science.

4. Senior undergraduate courses in Soil Science may in certain cases be taken for credit. Courses from other Departments and Faculties are required according to the field of specialization. Examples of the latter are Biochemistry 300, 511, 531; Botany 320; Chemistry 312, 372, 450, 511, 571; Geology 303, 304, 404, 465, 466; Mathematics 304, 306; Microbiology 360; Pharmacy 501, 502; Physics 340, and 380.

5. *Graduate Courses*

501. Special Topics and Problems Max. of 6 hrs. credit

520. Pedology (0-0; 3-3)

521. Chemical Methods as Applied to Soil Research (3-3; 0-0)
G. R. Webster

531. Physical Methods as Applied to Soil Research (0-0; 3-3)
J. A. Toogood

631. Seminar—Staff

SURGERY AND CLINICAL SURGERY

Research facilities are available in the Surgical-Medical Research Institute for graduate students who wish to register for the degree of M.Sc. This laboratory is well equipped for all types of experimental work on animals of all sizes. Special facilities are available for projects in the fields of experimental cardiovascular, gastrointestinal, renal and endocrine physiopathology. An adequately equipped isotope laboratory and a biochemical laboratory with technical staff are available in any of the clinical fields to assist the graduate students who wish to carry out a research project in this laboratory.

Inquiries should be directed to the Head of the Department of Surgery, University Hospital.

ZOOLOGY

1. The Department of Zoology has facilities to train students for the M.Sc. and Ph.D. degrees. Particular emphasis is laid upon ecology, physiology, invertebrate zoology, parasitology and animal behavior. A reference collection of the invertebrate and vertebrate fauna of Alberta is housed in the department. An electron microscope and histological, radio-biological and controlled aquatic environment apparatus are available as well as general laboratory and collecting equipment. The Alberta Biological station serves as headquarters for summer field work.

2. A number of Assistantships for graduate students are available. Funds are also available for the support of researches undertaken during the summer.

3. All inquiries concerning registration and financial assistance should be directed

to the Head of the Department of Zoology. Registration as a graduate student in Zoology is done in consultation with members of the department. Attention is directed to the General Regulations of the Faculty of Graduate Studies.

4. *Graduate Courses*

Zoology—

515. Introduction to Mathematical Biology—S. A. Altmann (3-0; 3-0)

520. Seminar in Zoology—D. M. Ross (1-0;1-0)

521. Mechanisms of Evolution—J. R. Nursall (0-0; 3-0)

525. Field Course in Zoology—Staff

529. Special Problems in Zoology—Staff (3 hrs. either or both terms)

540. Environmental Physiology—C. P. Hickman (1-5; 1-5)

555. Wildlife Parasitology—J. C. Holmes (0-0; 3-3)

556. Helminthology—J. C. Holmes (1-5; 1-5)

562. Conservation Topics (1-0; 1-0)

565. Principles of Conservation and Wildlife Management
W. A. Fuller and V. Lewin

571. Animal Behavior—S. A. Altmann (0-0; 3-0)

582. Advanced Histology—G. O. Mackie (0-0; 3-3)

XXIII

Awards and Financial Assistance

GENERAL INFORMATION

This Calendar includes a complete list of awards of all kinds and of financial assistance available to students at the University of Alberta, Edmonton and Calgary, as shown in the Table of Contents. Unless it is otherwise stated in the terms, awards are tenable in either Edmonton or Calgary.

Students of high ability or those who require financial assistance are urged to read carefully the sections of interest to them.

Application forms may be had from the Student Awards Office, Edmonton, or from the Registrar's Office, Calgary. Unless otherwise stated completed applications must be received by the Student Awards Office, Edmonton, by dates as follows:

Matriculants	— August 1
Undergraduates	— June 15
Graduates	— March 1

Where no application information is shown, the award is made automatically without applications.

Publication of Awards is as follows:

Graduating or Graduate Students	— Spring Convocations
Undergraduate (automatic awards)	— Mid-June
Undergraduate (awards applied for)	— First week of July
Matriculant (and Undergraduate of Aug. 1 date)	— First week of Sept.

In order that awards may be equitably distributed, no student may hold more than one major award in any one year. All monetary awards except certain cash prizes are contingent upon the student proceeding with his university course and are payable only when the student is in actual attendance at the University. Payment of fees is a first charge against such awards.

The University assumes liability for the payment of fellowships, scholarships, bursaries, prizes and other awards only to the extent that gifts from donors, or returns from particular investments for these purposes, will permit.

For further information inquiry should be made to:—

Mr. R. B. Wishart,
Administrator of Student Awards,
Student Awards Office,
University of Alberta,
Edmonton, Alberta.

or Office of the Registrar,
University of Alberta,
Calgary, Alberta.

For information regarding assistance under the Provincial Students Assistance Act refer to special section in this calendar or inquire of Student Awards Office, Edmonton or Student Counselling Services Office, Calgary.

As this calendar is published a considerable time before the opening of the Session, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular awards.

MATRICULATION AWARDS

Note: Unless otherwise stated in the terms of any award, these awards are tenable at the University of Alberta in Edmonton or Calgary. There are a few which are also tenable at a Junior College affiliated with the University. If so, this is stated in the terms.

Awards by the University of Alberta and the Province of Alberta are listed first. The remainder are listed alphabetically.

University of Alberta Honor Prizes—The Board of Governors of the University offers annually a prize to the value of $50.00 to each student from Alberta high schools entering a degree or diploma program in the University with an average standing in the required examinations of matriculation of at least 85%.

The University of Alberta Scholarships of the value of three year's fees are offered annually by the University to three matriculating students from Alberta High Schools, (other than those eligible for a Tegler or a Bennett matriculation scholarship) with the highest standing in the required matriculation subjects. This must be at least 80% and grades X to XII inclusive must have been completed in not more than four years. Second class standing must be achieved for continuation of the award.

Apply to Administrator of Student Awards by August 1.

University of Alberta War Memorial Scholarships—The War Memorial Fund of the University of Alberta will provide one or more scholarships of $650.00 to be awarded for study in a degree program at the University of Alberta on the basis of scholastic ability and financial need and according to the following priorities: (1) to a son or daughter of a member of the armed forces or merchant navy who lost his or her life during, or as a direct result of, hostilities in the War of 1939-45; or (2) to the son or daughter of a member of the said forces or merchant marine who was seriously incapacitated either physically or mentally; or (3) to the son or daughter of any man or woman who served in any of His Majesty's or Allied forces during 1939-45. Failing the receipt of applications from the above-mentioned groups, consideration will be given to applications from (4) sons or daughters of native or naturalized Canadians domiciled in Alberta.

This scholarship is available to matriculants or undergraduates.

Applications should reach the Administrator of Student Awards by August 1.

Province of Alberta Matriculation Scholarships (The Queen Elizabeth Education Scholarship Fund)—The Province of Alberta, under the Students Assistance Act, has made possible the establishment of three hundred matriculation scholarships of $100 each to bona fide residents of Alberta. The basis of award is academic attainment provided that the average mark of senior matriculation shall be at least 75%. The scholarships are tenable in the first year

at the University of Alberta or in a course of university level at a Junior College affiliated with the University. They are also tenable at an approved college or university when the course being taken is of university level and is not available at the University of Alberta.

The amount of the scholarship may be increased according to the financial need of the student, to a maximum which may in some cases be as high as $1,250. Application may be made for the basic $100 without evidence of financial need. If the application is for more than $100, the form must be filled in completely in order to indicate the amount of financial need.

Apply to Secretary, Students Assistance Board, Provincial Department of Education, by August 10. Applications received after August 10 will be considered in order of receipt if three hundred applications have not been already received. Application must be made on the Provincial Government form.

The Alberta Hotel Association Scholarships. Forty-three scholarships of $500.00 each and 20 of $250.00 each are offered to matriculants from Alberta High Schools entering the University of Alberta in Edmonton or Calgary or in a course of University level at a Junior College affiliated with the University of Alberta or at another university if the program is not available in Alberta. The scholarships of $250.00 are intended for students who can secure their desired course without leaving their home city. The basis of award is academic standing in Grade XII and financial need.

Application forms may be secured from The Alberta Hotel Association, Credit Foncier Bldg., 10275 Jasper Avenue, Edmonton, and should be completed and returned by August 1st.

The Alberta Institute of Agrologists Scholarship in First-Year Agriculture, valued at $250.00, will be awarded annually to an applicant from either an Alberta high school or a provincial School of Agriculture on the basis of scholastic standing. This award is also tenable at a Junior College affiliated with the University, providing the program is offered.

Apply to the Administrator of Student Awards by August 1.

The Alberta Motor Transport Association Bursaries—A number of bursaries will be provided annually to matriculants from Alberta High Schools to enter any degree or diploma program at the University of Alberta, Edmonton or Calgary, or a program of University level at a Junior College affiliated with the University. The values will be up to $500.00 if the student must live away from home or up to $300.00 if the student is able to live at home.

The basis of award will be academic standing and financial need. A reasonable geographical distribution within the Province will be made.

Apply to the Administrator of Student Awards by August 1.

The Alberta Wheat Pool Bursaries for Rural Students of $500 per year each are offered to two students from Alberta High Schools, one whose home is in the southern half of the Province (inclusive and south of township 44) and one from the northern half. These awards are open to students whose parents are actively engaged in farming. Preference will be given to applicants entering the Faculty of Agriculture but others will be considered. The scholarships are

renewable up to a maximum of five undergraduate years provided an average of not less than 65% is maintained. The basis of award will be matriculation standing and financial need.

Apply to Administrator of Student Awards by August 1.

The Alberta Wheat Pool Scholarships of the value of $200.00 each are offered annually to three students of outstanding merit entering the first, second and third years of Household Economics at the University of Alberta. These scholarships are available to students who have been members of 4H Homemaking Clubs.

Applications must be submitted to the Supervisor of 4H Clubs, Provincial Department of Agriculture, Edmonton, by August 1.

The Association of Professional Engineers of Alberta Matriculation Awards. The Association will provide six awards of the value of tuition and fees for the first year to six students on the following basis. The awards will be given to the student with the highest average standing on Mathematics 30, Mathematics 31, Chemistry 30 and Physics 30 in each of Edmonton and Calgary and the general areas of Lethbridge, Medicine Hat, Red Deer and Peace River provided such students enter Engineering, Geology or Geophysics at the University of Alberta.

The Viscount Bennett Scholarships—The late Right Honorable Viscount Bennett, P.C., K.C., LL.D., D.C.L., of Calgary and Mickelham, founded a trust to support scholarships open to students who have resided for at least five consecutive years in Calgary, or within twenty miles of that city, or in Banff National Park.

Twelve scholarships of $300.00 each are available for competitive award on the basis of academic attainment, good character and satisfactory personal qualities. The scholarships may be held in any year or program, but at least three will be reserved for matriculants.

Applications from matriculants should reach the Administrator of Student Awards by August 1.

The William Asbury Buchanan Bursary of $100.00 from a trust created by the will of the late Senator William Asbury Buchanan will be awarded to a student whose home is in the Lethbridge Public School District, the Lethbridge Separate School District or the Lethbridge School Division on a basis of academic standing, financial need and extra-curricular activities. The award is tenable at Lethbridge Junior College or the University of Alberta.

Apply to the Administrator of Student Awards by August 1.

The Calgary and District Retail Druggists' Association Scholarship of the value of $250.00 is offered to a student of outstanding merit entering first year Pharmacy. The award will be based on the standing in the required subjects of grade XII. The student must have carried out the work of grade XII in that part of Alberta south of a line from Rocky Mountain House to Red Deer to Coronation, but not including those centres.

Apply to the Administrator of Student Awards by August 1.

The Calgary Men's Canadian Club Scholarship of $100.00 is awarded to a male student from a Calgary high school entering the University of Alberta, Calgary. The award will be made on the basis of Grade XII standing and financial need.

Apply to the Administrator of Student Awards by August 1.

The Calgary Herald Scholarship in Engineering of $1,000.00 (or $1,100.00 in the event of the winner being a former Calgary Herald Carrier) will be awarded on the basis of matriculation standing to a student entering Engineering at the University of Alberta whose home is in that part of Alberta south of a line from Rocky Mountain House to Red Deer to Coronation and who matriculates from a school in that area.. The award will be paid in instalments of $300.00 (or $400.00—see above), $300.00, $200.00, $200.00 at the beginning of the four academic years, provided that the holder's average in the first, second and third years shall not fall below 75%.

Apply to the Administrator of Student Awards by August 1.

The Calgary Herald Scholarship in Classics. A scholarship of $500.00 is offered to a matriculant who proposes to enter the Honors Classics program at the University of Alberta, Calgary. This scholarship will be awarded on the basis of the matriculation examination in Latin. Additional consideration would be given to an applicant who has Greek 100.

In case no suitable candidate presents himself in any year the scholarship may be awarded on the results of the first year's work in Honors Classics at the University in Calgary.

Apply to Administrator of Student Awards by August 1.

The Canadian Arthritis and Rheumatism Society (Alberta Division) Bursaries of $350 each are offered to three matriculants entering first year of the School of Rehabilitation Medicine at the University of Alberta on a basis of academic standing in Grade XII and of financial need. It is expected that recipients of these bursaries will work for the Society for at least one year after graduation.

Apply to the Canadian Arthritis and Rheumatism Society, Alberta Division, 809 Centre St. S., Calgary, Alberta by August 1.

The Canadian Bechtel Limited Bursary in Engineering of $600.00 is awarded annually on the basis of financial need and of matriculation standing to a matriculant from an Alberta high school entering the first year of Engineering at the University of Alberta.

Apply to the Administrator of Student Awards by August 1.

Canadian Fina Oil Scholarships. A number of scholarships of $700 each will be awarded with priority to Division A.

Division A covers Company employees and children or wards of such to enter any undergraduate program at any recognized university. These awards are renewable to a maximum of four years providing satisfactory academic standing is maintained. Under this Division completed application forms should be returned to Canadian Fina Oil Scholarship Committee, 736 - 8 Ave. S.W., Calgary, Alberta, by July 1.

Division B covers matriculants from High Schools in Alberta or Saskatchewan to enter the University of Alberta or the University of Saskatchewan in Engineering, Geology or Geophysics. Matriculants must apply in their year of High School graduation. The award will be made on a basis of academic standing (not less than 70%) and financial need and will be for one year only. Consideration may be given to undergraduates already in any of the listed programs. Under Division B application for the University of Alberta should be made to the Administrator of Student Awards by August 1.

The donor will, in addition, provide a grant-in-aid of $250 to the University for each scholarship holder.

The Canadian Foundation for Poliomyelitis and Rehabilitation (Alberta Chapter) Bursaries of $350.00 are offered to students in the Diploma program in Rehabilitation Medicine. The Foundation is sponsored by the Royal Canadian Legion. Three bursaries will be awarded each year, preferably one at each of the levels of entering first, second and third years. The basis of award will be academic standing and fiancial need. It is expected that recipients will carry on their profession in Alberta for a reasonable period after graduation. Apply to the Administrator of Student Awards by August 1.

Canadian Mathematical Congress Scholarships in Mathematics.

The Friends of the Canadian Mathematical Congress Scholarships, one of the value of $500.00 and one of the value of $350.00.

The Nickle Foundation Scholarship in Mathematics of the value of $400.00.

The Haddin, Davis and Brown Limited Scholarship of the value of $250.00.

These scholarships will be awarded to students who have taken all of their Grade XII work at an Alberta high school, have obtained satisfactory standing in this work (including Mathematics 30 and 31), and are entering the first year of a degree program at a University. The awards will be made primarily on the basis of special competitive examination in mathematics to be set and marked by the Department of Mathematics and to be written early in May.

The first Scholarship of the Friends of the Canadian Mathematical Congress is to be paid to the over-all winner in this competition.

These scholarships may be taken in any degree program. The Nickle Foundation Scholarship in Mathematics is tenable only at the University of Alberta. The othere are tenable at the University of Alberta or any other Canadian University.

Candidates should apply direct to their High School Principal by March 15. Principals will forward the names to the Department of Mathematics, University of Alberta, Edmonton, by March 31.

The Canadian Superior Oil Ltd. Bursary is offered to a male Canadian citizen entering the first year of a program in Chemistry, Geology, or Engineering at the University of Alberta. The bursary will cover tuition fees and books for a four year period and may also include a subsistance allowance if deemed necessary.

The award will be made on a basis of grade XII standing and financial need. A change in program from any of the above three, or failure to maintain a satisfactory academic standing will entail forfeiture of the bursary.

Apply to the Administrator of Student Awards by August 1.

The Cardston Pharmacy Scholarship of the value of $100.00 is offered annually to a student of outstanding merit entering first year Pharmacy.

Apply to the Administrator of Student Awards by August 1.

The City of Calgary Matriculation Scholarships. Seven scholarships of $500.00 each are offered annually by the City of Calgary to Calgary matriculation students entering first year university in any faculty. The awards will be made on the basis of proficiency and financial need. The students will be given free choice in selection of university to be attended.

Written application setting forth the financial ability of the home and other pertinent information should be received by the City Clerk, Calgary, by August 1 on the forms available at the Office of the City Commissioner, Calgary.

The City of Edmonton Matriculation Scholarships. Two scholarships of the value of $300.00 each are offered annually by the City of Edmonton to matriculating students entering first year at the University of Alberta at Edmonton. One of these will be restricted to a student who has attended an Edmonton School from Grade X to Grade XII. The basis of award will be academic standing and financial need.

Apply to Administrator of Student Awards by August 1.

The Civil Service of Alberta Bursaries—Up to ten bursaries of a maximum of $500.00 are offered annually to first year University students from Alberta high schools. These students must be the children of provincial civil servants, retired provincial civil servants or deceased provincial civil servants. The amount of $500.00 will be paid to each recipient who finds it necessary to live away from home while $250.00 will be paid to each recipient who can attend the chosen course while living at home. These bursaries are tenable at the University of Alberta in Edmonton or Calgary or in a program of university level at a Junior College affiliated with the University. The awards will be made with due regard to geographical distribution. Some may be tenable at the Institutes of Technology, Calgary and Edmonton.

Application forms may be obtained from the Executive Secretary, Civil Service Association of Alberta, Terrace Building, Edmonton, and should be completed and returned to him not later than July 31.

The Percy Clubine Memorial Scholarships of $500 each will be awarded annually to two students who are entering first year of the Faculty of Agriculture of the University of Alberta, conditional on a minimum Grade XII average of 70%.

Apply to Administrator of Student Awards by August 1.

Cominco Undergraduate Scholarships—The Consolidated Mining and Smelting Company of Canada offers annually two four-year awards of $1,400, payable at $350 per annum, and four one-year awards of $300, to matriculants who

are sons, daughters or wards of (1) a Cominco employee; (2) a widow whose husband died while regularly employed by Cominco; or (3) a Cominco pensioner or his widow. Applicants must attain an average of at least 75% in the required subjects of senior matriculation or the equivalent.

Applications are due June 1, and further information and application forms may be obtained from the Secretary, Scholarship Committee, The Consolidated Mining and Smelting Company of Canada Litmited, Trail 1, British Columbia.

The Crown Zellerbach Canada Limited Matriculation Scholarships of $1,500 each are offered annually to two Canadian students of outstanding academic merit who are entering the Faculty of Education, University of Alberta. One scholarship will be tenable at Edmonton and one at Calgary. The amounts will be payable at $400.00 in each of the first and second years and $350.00 in each of the third and fourth years. In order to continue to be eligible, the student must take the four years of the program consecutively and achieve an average of at least 65% each year.

Apply to the Administrator of Student Awards by August 1.

The E.I.C. Wives Club of Calgary Scholarship of $100.00 is awarded to a deserving student entering first year Engineering at the University of Alberta Calgary, with high entrance standing and who receives no other major award.

Edmonton Civic Employees Bursaries. Up to fourteen bursaries of $450.00 each are offered annually to matriculants entering the University of Alberta or to holders of High School Diplomas entering The Institutes of Technology, Calgary and Edmonton. The basis of award will be academic standing in Grade XII and financial need.

Applicants must be children of City of Edmonton Civic employees, deceased civic employees or retired civic employees.

Application forms may be obtained from The Executive Secretary, Edmonton Civic Employees' Welfare Chest Fund, Finance Department, City Hall, Edmonton and should be completed and returned to him by July 31.

The Edmonton and District Druggists' Association Scholarship, of the value of $100.00, is offered annually to a student of outstanding merit entering first-year Pharmacy. The award will be based on the standing in the required subjects of Grade XII. The student must have carried out the work of Grade XII in that part of Alberta north of a line from Rocky Mountain House to Red Deer to Coronation and including those centres.

Apply to the Administrator of Student Awards by August 1.

The Federated Pipe Lines Ltd. Scholarship of $500 is offered annually to a student of outstanding academic merit entering the first year of any Faculty of the University of Alberta. The scholarship is subject to renewel for three further years or until graduation whichever is less, providing a satisfactory academic standing is maintained.

Apply to Administrator of Student Awards by August 1.

The Friends of the University Matriculation Bursaries of $150 each will be offered to two students from Alberta High Schools, other than those of the City of Edmonton, the City of Calgary or within 20 miles of that City or in Banff

National Park, on a basis of matriculation standing and finanacial need. Grades X to XII inclusive must have been completed in not more than four years.

Apply to Administrator of Student Awards by August 1.

General Motors Scholarship—General Motors of Canada Limited offers annually one matriculation scholarship to an outstanding student who is entering any program at the University of Alberta. The scholarship may be renewed up to a maximum of four years, providing the recipient maintains a high standard of scholarship (at least 75%). If the student's scholarship falls below this, the award may be transferred to another qualified candidate.

The size of the award will be determined by the recipient's financial need, and may vary from $200.00 to $2,000.00 per year. A grant-in-aid of $500.00 for each scholarship will be paid to the University.

Applicants must be citizens of Canada. The basis of award will be high scholastic standing, personal qualities and financial need. A General Motors Scholar may not hold any other major award.

Apply to the Administrator of Student Awards by August 1.

The C. O. Hicks Matriculation Scholarship of $200.00 provided by alumni, teachers and former teachers of Victoria Composite High School, will be awarded annually to a matriculating student who has attended this High School for at least two years including the graduating year. The bases of award will be academic merit and qualities of good citizenship. The award will be paid $100.00 entering first year and $100.00 entering second year dependent on satisfactory completion of first year.

Applications should be made by letter to the Principal, Victoria Composite High School by September 1. Applicants must provide proof of academic standing and of admission to the University.

The Imperial Order Daughters of the Empire Matriculation Bursaries—The Provincial Chapter of Alberta, Imperial Order Daughters of the Empire, has provided four bursaries for matriculating students, known as the Coronation Bursaries, of the value of $750.00 each. These are tenable at the University of Alberta and are each made in three yearly payments. Two of the bursaries are reserved for children of men or women who served overseas with the British forces during the Great Wars. All candidates must have resided in the province of Alberta for at least three years prior to application.

The provincial educational secretary of the Imperial Order Daughters of the Empire will notify the high schools in February of each year, of the impending award, all applications to be in her possession by June 1. Further information and application blanks may be obtained from Mrs. D. McCulloch, 13105-104 Avenue, Edmonton, Alberta.

The Imperial Order Daughters of the Empire Second War Memorial Matriculation Bursaries—A number of bursaries for matriculating students are offered annually by the Imperial Order Daughters of the Empire as part of the 1939-45 War Memorial. They are tenable at any University in Canada. At least one bursary will be awarded in each Province and one in the Yukon, provided there are suitable candidates. The awards are of the value of $1,600.00.

i.e. $400.00 a year for four years: $500.00 each in the first and second years and $600.00 in the third of a three year course; $350.00 in the first, $300.00 in the second, third and fourth years and $350.00 in the fifth year of a five year course. The continuation of the award is subject to the holder's passing the examinations of each year and satisfying the Provincial Committee of Selection of his or her continued fitness to retain the Bursary.

An application, which must be submitted not later than April 1, must include certified evidence to the fact that the candidate is the son or daughter of a deceased or permanently and seriously disabled member of the Services of the second World War. Consideration will also be given to the applicant's general record and standing in school, physical fitness and circumstances of the family.

Further information and application blanks may be obtained from the provincial educational secretary, Mrs. D. McCulloch, 13105-104 Avenue, Edmonton, Alberta.

The Imperial Order Daughters of the Empire Lethbridge Municipal Chapter Bursary of the value of $500.00 is offered annually to a matriculant in memory of the veterans of both World Wars. This bursary is tenable at the University of Alberta or at Lethbridge Junior College and is payable over a period of three years: $200.00 the first year, $150.00 each year for the second and third years. The bursary is open to application from children of men or women who served with the Canadian or British Armed Forces during either the First or Second World Wars, and who have attended a Lethbridge High School for at least two years prior to making application. The Lethbridge Municipal Education Secretary will notify the High Schools in October of each year of the impending award, all applications to be in her possession by May 1. Further information and application blanks may be obtained from Mrs. Owen Williams, Municipal Education Secretary, Lethbridge Municipal Chapter, I.O.D.E.,, 532 - 15 St., South, Lethbridge, Alberta.

The Inco Scholarhip of $300 plus fees (the total not to exceed $700) will be offered annually to a matriculant of outstanding merit who is entering first year at the University of Alberta in Engineering, Mathematics, Chemistry, Physics, Geology or Geophysics. The award is renewable to a maximum of four years providing the holder maintains satisfactory standing. In addition the donor provides a grant to the University of $500.

Apply to Administrator of Student Awards by August 1.

The Interfraternity Council Scholarship of the value of approximately $400.00 is offered annually by the University of Alberta Interfraternity Council to a matriculant of outstanding merit entering the first year of any degree or diploma program at the University of Alberta, Edmonton. The money is provided from the proceeds of the annual Interfraternity Songfest. The extra-curricular activities of the student during high school will be considered in making this award.

The Keith Stationers Ltd. Bursary of $400 will be offered annually to a matriculant entering the first year of the Faculty of Commerce, University of Alberta, Calgary, on a basis of Grade XII standing and of financial need. The

student's home must be in that portion of the Province inclusive of and south of Red Deer.

Apply to Administrator of Student Awards by August 1.

The Masonic Bursaries of $500 each are offered by the Grand Lodge of Alberta, AF and AM, to students from Alberta High Schools to attend the University of Alberta, or a Junior College affiliated with the University or any other recognized University if the program of studies is not available at the University of Alberta. A variable number up to a maximum of sixteen may be given. A limited number of these may be renewable, conditional on continued financial need.

Apply to the Grand Secretary, Grand Lodge of Alberta, AF and AM, 330-12 Avenue, S.W., Calgary. Application forms must be completed and returned by April 30.

The Melton Real Estate Limited Scholarship of $350.00 will be offered annually to a student with high scholastic standing from an Alberta High School who is entering first year Faculty of Commerce, University of Alberta.

Apply to Administrator of Student Awards by August 1.

The Nickle Foundation Matriculation Scholarship of $1,000.00 is offered annually to a Grade XII student, from any Metropolitan Calgary High School, about to enter the University of Alberta, Calgary. Those eligible will be the recipients of the Nickle Foundation Grade Eleven Deferred Bursaries in the previous year and their alternates. Selection will be made by the Nickle Foundation Selection Committee.

The scholarship will be paid in four annual instalments of $250.00 provided the student maintains a satisfactory academic level.

The North Calgary Business and Professional Women's Club Bursary of $100.00 is offered to a woman student entering the first year of the Bachelor of Education program at the University of Alberta, Calgary. She must be under 21 years of age (at date of registration), have taken Grade XII in a Calgary High School north of the Bow River and have an average in Grade XII of at least 70%. The financial need of the student will be considered in making the award.

Apply to the Administrator of Student Awards by August 1.

The Pacific Resins Ltd. Customers' Scholarship, of $300.00 is offered to a student entering the first year at the University of Alberta in Chemistry, Chemical Engineering, or the Secondary B.Ed. Route majoring in Mathematics or Science.

The award will be made on the basis of high school record, financial need, and extra-curricular activities. Depending upon the holder's record during the first year, the company may decide to renew his scholarship.

Apply to the Administrator of Student Awards by August 1.

The Dr. A. J. Pauly Deferred Scholarships in Medicine. A number of scholarships of $500 each will be awarded to outstanding matriculants who state an intention to proceed into the Faculty of Medicine at the University of Alberta. The awards will be based on Alberta Grade XII standing or its equivalent but

the scholarships will be paid only on admission to the second year of the Faculty following completion of the first year with an average of not less than 70%.

Apply to Administrator of Student Awards by August 1.

The Peace River Pioneer Memorial Bursaries, provided by Mr. Charles Plavin of North Star, Alberta, may be awarded to High School graduates whose homes lie north of Township 68 and west of the 5th Meridian in the Province of Alberta and who are proceeding into first year of the University of Alberta or of any institution of university level affiliated with the University and located in the above area. The awards may be variable in amount and will be made on a basis of high academic standing and financial need.

Apply to Administrator of Student Awards by August 1.

Rotary Club of Calgary Golden Anniversary Bursaries. The Rotary Club of Calgary is offereing 50 bursaries of $500 each to matriculants from Calgary High Schools entering the first year of a degree program at the University of Alberta, Calgary, in September 1964. The chief basis of award will be high academic standing in the subjects required for admission but financial need may also be considered.

Apply to The Chairman, Scholarship and Awards Committee, University of Alberta, Calgary by July 15, 1964.

The Royal Canadian Legion Scholarship, valued at $400.00 is offered by the Dominion Command of the Royal Canadian Legion, B.E.S.L., for study in a degree program at University of Alberta on the basis of scholastic ability and financial need, and according to the following priorities: (a) to a son or daughter of a member of the armed forces or merchant navy who lost his or her life during, or as a direct result of, hostilities in the War of 1939-45; or (b) to the son or daughter of a member of the said forces or merchant marine who was seriously incapacitated either physically or mentally; or (c) to the son or daughter of any man or woman who served in any of His Majesty's or Allied forces during 1939-45. Failing the receipt of applications from the above-mentioned groups, consideration will be given to applications from (d) sons or daughters of native or naturalized Canadians domiciled in Alberta.

Preference will be given to matriculants or to students who have completed the first year at University.

Apply to the Administrator of Student Awards by August 1.

The St. Hilda's Matriculation Scholarships. Two scholarships of $300 each are provided annually by the St. Hilda's Trust Fund for women students entering the first year of the Faculty of Arts and Science at the University of Alberta, Calgary.

Preference will be given to any applicant who is a graduate of St. Hilda's School for Girls or a descendant of any such graduate, or of a graduate of St. Hilda's College. Applicants with these qualifications must state so in a separate letter attached to the regular university scholarship application form.

Apply to the Administrator of Student Awards by August 1.

The Robert David Sinclair Scholarship in First-Year Agriculture of $150.00 in memory of Robert David Sinclair, late Dean of the Faculty of Agriculture, is offered by his family to a student entering first year of this Faculty.

The scholarship is open to students from schools of agriculture and high schools in Alberta and will be awarded on the basis of scholastic standing.

Apply to the Administrator of Student Awards by August 1.

The Society of Exploration Geophysicists Scholarships—The Society offers annually four scholarships of $500.00 each to Canadians majoring in Geophysics at Universities in Canada. The award will be based on academic record and financial need. Applicants may be matriculants entering first year University or undergraduates or graduate students.

Application forms may be secured from Canadian Society of Exploration Geophysicists Scholarship Sub-committee, P.O. Box 117, Calgary, Alberta, and should be returned completed to the same address by March 15.

The Steel Company of Canada Bursary of $500 per annum is offered annually to a student entering first year at the University of Alberta, in any degree or diploma course. The bursary will be renewed each year for four years or until the student has completed his or her course whichever is less, provided a satisfactory academic standing is maintained. The financial need of applicants is to be considered. Applicants must be permanent Canadian residents. In addition a grant-in-aid of $500 per annum in respect of each bursary will be paid to the University.

Apply to the Administrator of Student Awards by August 1.

The Robert Tegler Matriculation Scholarships—The Robert Tegler Trust provides annually three scholarships of the value of full fees for three years in any Faculty of the University of Alberta, to the three students from High Schools in the City of Edmonton with the highest average standing in the regular examinations of Grade XII for matriculation (not less than 80%). Applicants must be British subjects, must have completed Grades X to XII in not more than four years in the Province of Alberta and at least Grade XII in an Edmonton High School. Second class standing must be achieved in order to continue holding the scholarship.

Apply to the Administrator of Student Awards by August 1.

The Robert Tegler Special Scholarships—The Robert Tegler Trust has provided two special scholarships of tuition fees plus $300 for handicapped students, tenable in any faculty to which the students can be admitted, and available to new students or continuing undergraduates. While due weight will be given to the academic record of candidates, special consideraiton will be given to their background, financial need, nature of handicap, personal qualities, and other relevant points. The scholarships may be awarded to the same students a second time, or even throughout the whole undergraduate course.

Apply to the Administrator of Student Awards by August 1.

The University Women's Club of Edmonton Scholarship of $500.00 is awarded annually to a woman student of outstanding merit entering the first year of a degree program at the University of Alberta. It may be held concurrently with

any other award or awards and will be given to the woman student with the highest average standing (at least 85% in the June matriculation examinations Grade XII) in Alberta who by accepting it will not forfeit any other award (or portion thereof) of an equal or greater value than this scholarship. It is payable $300.00 in the first year, and $200.00 in the second year, provided that she obtains at least 75% in her first year.

Apply to the Administrator of Student Awards by August 1.

The Union Carbide Scholarship having a maximum value of $2,500.00 is offered annually to a male matriculant who will be entering the Faculty of Commerce or Engineering or the Physical Sciences of the Faculty of Science (i.e. B.Sc. programs in Chemistry, Geography, Geology, Mathematics or Physics) and who intends, after graduation, to enter business, industry or education. The amount will be payable $700.00 during the first year and $600.00 in each subsequent year. The student must maintain an average of at least 65% to continue to be eligible. The student should not be in receipt of other monetary scholarships exceeding $200.00 in any one year. The award will be made on the basis of a satisfactory High School standing but financial need will also be considered.

Apply to the Administrator of Student Awards by August 1.

The Hon. W. C. Woodward Scholarship of $500 per year is offered annually in competition to sons, daughters and legal dependents of full-time employees, of retired employees, and of employees who died while in the service of Woodward Stores (Edmonton) Limited. It is open to matriculants entering any degree course at the University of Alberta. The bases of award will be scholastic standing in the required subjects of senior matriculation in Alberta or equivalent standing as accepted by the University of Alberta, activity and interest in youth organizations, and outstanding qualities of citizenship, leadership and service.

The scholarship will be renewable each year up to a maximum of five years of undergraduate study, provided that the holder's academic standing and general conduct are satisfactory to the University.

Application forms are available from the Personnel Department of any Woodward Department Store and should be completed and returned to the same Department by July 15.

UNDERGRADUATE AWARDS

The following prizes, scholarships and bursaries are available to students in any faculty of the University:

University of Alberta First Class Standing Prizes. The Board of Governors of the University offers annually a prize of $50.00 to each undergraduate student in a degree or diploma program at the University of Alberta, who, in the work of the preceding year at the University or at a Junior College affiliated with the University, obtained an average standing of 80% or better. This includes students in the graduating year who return to the University for further studies.

Province of Alberta Undergraduate Scholarships (The Queen Elizabeth Education Scholarship Fund)—The Province of Alberta, under the Students Assistance Act, has made possible the establishment of three hundred undergraduate scholarships of $100 each to bona fide residents of Alberta. The basis of award is academic attainment provided that the average mark of the previous year shall be at least 75%. The scholarships are tenable at the University of Alberta. They are also tenable at an approved college or university when the course being taken is of university level and is not available at the University of Alberta.

The amount of the scholarship may be increased according to the financial need of the student, to a maximum which may in some cases be as high as $1,250. Application may be made for the basic $100 without evidence of financial need. If the application is for more than $100, the form must be filled in completely in order to indicate the amount of financial need.

Apply to Administrator of Student Awards, University of Alberta by or before June 15. Application must be made on the Provincial Government form

University of Alberta War Memorial Scholarships—See details given under Matriculation Scholarships.

The Royal Canadian Legion Scholarship—See details given under Matriculation Scholarships.

The Viscount Bennett Scholarships—See details given under Matriculation Scholarships.

Applications for Bennett Scholarships from undergraduates should reach the Administrator of Student Awards by June 15.

The Robert Tegler Special Scholarships—See details given under Matriculation Scholarships.

The City of Calgary Undergraduate Scholarships. Two scholarships of $500.00 each are offered annually by the City of Calgary to Calgary students entering the second year at any approved university. The awards will be made on the basis of proficiency and financial need.

Written application setting forth the financial ability of the home and other pertinent information should be received by the City Clerk, Calgary by June 10 on forms available at the office of the City Commissioner, Calgary.

The City of Edmonton Undergraduate Scholarships. Four scholarships of the value of $300.00 each are offered annually by the City of Edmonton to undergraduate students in any year of any Faculty in the University of Alberta at Edmonton. Two of these are restricted to students who have attended Edmonton Schools from Grade X to Grade XII. The basis of award will be academic standing and financial need.

Apply to the Administrator of Student Awards by June 15.

The Faculty Women's Club, Calgary, Prize of $75.00 will be awarded annually to the student with the highest academic standing of the second year in any Faculty of the University of Alberta, Calgary.

The Glendale Kiwanettes of Calgary Scholarship of $100.00 is offered annually to a student of outstanding academic merit completing the first year of any Faculty at the University of Alberta, Calgary.

The P. Lawson Travel Ltd. Summer Scholarships. In order to promote greater understanding and good will between Canadians and other peoples, one or more scholarships of approximately $1,000.00 each are offered each year to students from the University of Alberta, Calgary for summer study in Europe. Certain countries may be specified by the donor. Preference will be given to students studying languages and who intend to pursue a teaching career in Alberta. Awards will not be made to students who have already travelled in, or whose native tongue is the same as, the stipulated country.

The award will be based on (a) academic standing, (b) community work, (c) extra-curricular achievements and (d) financial need.

Apply to the Scholarship Committee, University of Alberta, Calgary by December 1.

The Procter and Gamble Company Bursaries, of a total annual value of $1,500 are provided to assist undergraduates of any faculty who are in need and have adequate academic standing (at least 65%). In addition the Company provides an annual grant of $600 to the University.

Apply to the Administrator of Student Awards by June 15.

The Samuel J. McCoppen Bursaries of a total annual value of $1,500.00 are provided under the will of the late Samuel J. McCoppen for undergraduates who have completed the first or second year at the University of Alberta. The basis of award will be financial need and academic standing.

Apply to the Administrator of Student Awards by June 15.

The IBM-Thomas J. Watson Memorial Bursaries of a total annual value of $1,000.00 are provided by International Business Machines Company Limited for undergraduates in any year or faculty who are in need of financial assistance and who have an academic standing of at least 65%. In addition, the donor provides an annual grant-in-aid of $500.00 to the University.

Apply to the Administrator of Student Awards by June 15.

The Reg. Lister Trophy and Prize. The trophy and a cash prize of $50.00 will be presented annually to the undergraduate student who, during the previous academic session, lived in the University of Alberta Men's Residences in Edmonton and had the highest academic standing of all students so resident.

The J. M. MacEachran Essay Prizes are offered annually by the Philosophical Society of the University at Edmonton. The essay competition of the society is open to all undergraduate students and prizes are awarded for the best three essays.

Full details of the competition are announced each year by the Philosophical Society.

C.U.S. Interregional Exchange Scholarships. By arrangement between certain Canadian universities undergraduate or graduating students may apply for a year's study at another university in a region other than that in which the student is attending. The four regions are: Western, English Central, French Central and Atlantic. Applicants must be bona fide students who have completed at least one year of university work beyond complete senior matriculation. They may return to their home university after the exchange year or remain at their own expense. Successful candidates will be accorded remission of tuition fees for the exchange year. Travel assistance will be provided by C.U.S. (through a grant from Canada Council). Academic standing and extra-curricular activities will be considered.

Application forms may be had from the C.U.S. campus representative or the Administrator of Student Awards and must be filed by January 15.

Calgary students should apply to their own C.U.S. campus representative.

The German Academic Exchange Scholarship is offered annually by the Federal Republic of Germany to a student from the University of Alberta. Applicants must have completed at least two years university work, be between 20-30 years of age, and be fluent in the German language.

The scholarship is tenable for 12 months beginning September 1 at a University or at an Academy of Art or Music. The scholarship covers tuition fees, partial travel costs and living allowance.

Apply to the Administrator of Student Awards by January 15 so that completed applications may be in Ottawa by February 1.

The French Government Bursary. The government of the French Republic offers annually to a graduating student a bursary to provide for study at a French university. There is no restriction on field of study provided the candidate has an adequate knowledge of French. The award is for one academic year and covers tuition fees, a living allowance and sea passage from France to Canada at the conclusion. The award is made by the Cultural Counsellor of the French Embassy in Ottawa, on the nomination of the University.

Apply to the Head, Department of Romance Languages, Edmonton by Feb. 1.

Extra-curricular Awards—Edmonton

The following awards are based mainly on extra-curricular activities. They are awarded by special committee and will be announced each year at Colour Night.

Lorne Calhoun Memorial Award—The winner of this award, selected by a special committee made up of members of the Administration and Council executive, is a person who has made an outstanding contribution to student life in a broad variety of activities, and whose academic standing is satisfactory. The current President of the Students' Union is not eligible. The distinctive silver shield was first awarded in 1952 to perpetuate the memory of Lorne Calhoun, B.A., a student of the University from 1946 until his death in 1951, who during that time was most active in extra-curricular activities.

The Maimie Shaw Simpson Trophy in honor of Miss Maimie Shaw Simpson, first Dean of Women of the University of Alberta, will be awarded annually beginning in 1960. To qualify a candidate must be a woman member of the Student's Union, have obtained at least a second class standing in the previous academic year and have made an outstanding contribution to student life in a broad variety of activities.

The Walter Andrew Dinwoodie Award consisting of a plaque plus $100.00 will be awarded annually, in memory of Mr. Dinwoodie, Business Manager of the Students' Union 1949 to 1962, by the Students' Union of the University of Alberta, Edmonton, to an undergraduate in the second or subsequent year who is returning to the University of Alberta, Edmonton, the following year in a full-time program. The basis of award will be satisfactory academic standing and an outstanding contribution to some phase of extra-curricular activity, under the direction of the Students' Union, in the academic year in which the award is made.

The Joseph Dolson Oliver Mothersill Memorial Awards of the value of $200 each will be awarded annually to two students, one man and one woman, selected for outstanding contribution to student life in the University, especially through good citizenship and active support of student government.

The Women's Canadian Club of Edmonton Award of $100 will be given annually to a woman student in any program at the University of Alberta, Edmonton. The award will be based on outstanding extra-curricular activities and a satisfactory academic record in her previous years. The award will be dependent on the student returning for full-time studies at this University in the following academic term.

The Florence E. Dodd Prize of $50.00 is awarded annually to a woman student selected for satisfactory academic work and outstanding contribution to student life in the University through active participation in extra-curricular activities.

Block A Club Athletic Award of the value of $100.00 is offered by the Block A Club to a first year male student deemed outstanding in intercollegiate athletics.

The basis of the award will be athletic achievement and satisfactory academic standing (not less than 65%), as determined by all term examinations held prior to Colour Night. The award will be dependent on the student entering the second year at the University of Alberta.

Selection will be made by a committee appointed by the Block A Club.

Extra-curricular Awards—Calgary

The Calgary Musical Club Prize of $50 will be awarded annually to a student in Music at the University of Alberta, Calgary, who in the opinion of the Music Department at Calgary has made an outstanding contribution to the musical life of the University. Financial need may be taken into consideration.

Prizes and scholarships available in the various faculties are listed below according to faculty.

THE FACULTY OF ARTS, EDMONTON

The Governor-General's Gold Medal is awarded by His Excellency, the Governor-General, to the graduating student in an honors program from the Faculty of Arts in Edmonton or the Arts portion of the Faculty of Arts and Science in Calgary, who has shown the highest distinction in scholarship.

The Dean's Gold Medal in Arts, Edmonton is awarded annually to the graduating student from the general program in the Faculty of Arts in Edmonton who has shown the highest distinction in scholarship.

The Aluminum Company of Canada, Limited Scholarship of the value of $500 is offered annually to an undergraduate student in Engineering, Commerce, Law or Honors Arts or Science. The award will be based on academic standing, financial need and general character of the applicant, and may be held by the same student more than once. In addition the Company will provide a grant-in-aid of $200 to the University.

Apply to Administrator of Student Awards by June 15.

The Board of Governors of the University Scholarship of $100.00 will be awarded to the student with the highest standing in the first year of the Faculty or Arts, Edmonton, provided that an average of at least 75% is attained.

The Mary Cameron Douglas Memorial Scholarship, valued at $400.00, is available to a student of outstanding merit who is entering the fourth year of an honors program in the Faculty of Arts at Edmonton. The right is reserved to withhold the scholarship in any year if there is no candidate of sufficient merit.

The John Mills Imrie Memorial Scholarship of $300 will be awarded annually for 10 years beginning 1963 to a student of outstanding merit completing the first year of the Faculty of Arts at Edmonton.

The Edmonton Section of the Council of Jewish Women Scholarship of $100 will be awarded annually to the student with the highest standing in the second year of the honors program of the Faculty of Arts in Edmonton, provided an average of not less than 75% has been attained.

The Dr. Geneva Misener Memorial Scholarship of $300.00 provided under the will of the late Dr. Misener will be offered annually to a student of outstanding merit completing the third year of an honors program in Classics or Modern Languages at Edmonton provided first class standing has been achieved on the year's work.

The President's Scholarships—Three scholarships of $400.00 each were endowed in 1943 by Standard Investments Limited through the late Mr. Justice H. H. Parlee. These scholarships are open to undergraduates in the faculties of Arts, Science and Law. Proficiency in studies is the primary basis of award, and no award will be made to a student with less than 80%. Preferably these three awards will be given, one in a B.A. program, one in a B.Sc. program and one in Law. If the number of well qualified candidates exceeds the number of scholarships available, financial need will be taken into account in making the awards.

Apply to the Administrator of Student Awards by June 15.

The Renkenberger Scholarship of $250, provided under the will of the late Harvey Renkenberger of Barons, Alberta, will be awarded to an undergraduate student in the Faculties of Agriculture, Arts, Science, Education or Commerce who is especially interested in co-operative marketing. The basis of award will be academic standing and participation in relevant extra-curricular activities. The recipient should include in his program a senior course in economics preferably related to agriculture or marketing.

Apply to Administrator of Student Awards by June 15.

The Sunwapta Broadcasting Company Scholarship, of the value of $200 is offered by Mr. G. R. A. Rice to an outstanding student in Edmonton who is interested in the field of communications, as related to the Broadcasting and Television industry.

The award will be made to a student entering the fourth year in Engineering Physics (Electronics pattern), Electrical Engineering, or Honors Physics, or to a student entering the third or fourth year of a B.A. course who has displayed an active interest in student journalism, or in broadcast script writing. The basis of the award will be academic achievement in the work of the preceding session, particularly (in the case of Science students) in the courses directly concerned with electronics, or (in the case of Arts students) in senior English courses.

Apply to the Administrator of Student Awards by June 15.

THE FACULTY OF SCIENCE, EDMONTON

The Lieutenant Governor's Gold Medal is awarded by his Honor, the Lieutenant Governor of Alberta, to the graduating student in an honors program from the Faculty of Science in Edmonton or the Science portion of the Faculty of Arts and Science Calgary, who has shown the highest distinction in scholarship.

The Mary Wyman Memorial Gold Medal in Science is awarded annually to the graduating student from the general program in the Faculty of Science in Edmonton who has shown the highest distinction in scholarship.

The Aluminum Company of Canada, Limited Scholarship—See under Faculty of Arts.

The Board of Governors of the University Scholarship of $100.00 will be awarded to the student with the highest standing in the first year of the Faculty of Science, Edmonton, provided that an average of at least 75% is attained.

The James McCrie Douglas Memorial Scholarship. valued at $400.00, is available to a student of outstanding merit who is entering the fourth year of an honors program in the Faculty of Science at Edmonton. The right is reserved to withhold the scholarship in any year if there is no candidate of sufficient merit.

The Edmonton Lodge of B'nai B'rith Scholarship of $100.00 is awarded to the student with the highest standing in the second year of the honors program in the Faculty of Science in Edmonton. The record in the first year will also be taken into account.

The Encyclopaedia Britannica Award in Science consisting of a 54-volume set of The Great Books of the Western World will be awarded annually to a student of outstanding merit graduating from a B.Sc. Program in the Faculty of Science at the University of Alberta, Edmonton. The award is to be made chiefly on the performance of the student in the Humanities and Social Science options, provided that an overall average of not less than 70% in the full final year has been attained.

The Hamilton Watch Company Award consisting of an engraved watch and a certificate will be awarded annually to a student of outstanding merit graduating from a B.Sc. Honors program of the Faculty of Science. The achievements of the student—either acadmice or extra-curricular—in the Social Sciences or Humanities will be considered in making this award.

The Kenneth William Moodie Scholarship—As a memorial to her nephew, Flying Officer Kenneth William Moodie, a graduate in science of the University of Alberta who lost his life in May, 1942 while on operations, the late Miss Marion E. Moodie made provision in her will for an annual scholarship of $200.00 to a student of outstanding merit entering the first year of the Faculty of Medicine or the third year of the B.Sc. program in the Faculty of Science in Edmonton. The basis of award will be academic attainment on the previous year's standing at the University of Alberta, financial need and evidence of satisfactory personal qualities.

Apply to the Administrator of Student Awards by June 15.

The President's Scholarships—See under the Faculty of Arts.

The Renkenberger Scholarship—See under the Faculty of Arts.

The Sunwapta Broadcasting Company Scholarship—See under Faculty of Arts.

THE FACULTY OF ARTS AND SCIENCE, CALGARY

(The following awards are open only to the Faculty of Arts and Science, Calgary. For those open to both Edmonton and Calgary refer under the Faculty of Arts, Edmonton or the Faculty of Science, Edmonton.)

The Faculty of Arts and Science Gold Medals, Calgary, provided by an anonymous donor, are awarded annually to the graduating student in the general B.A. program and the graduating student in the general B.Sc. program of the Faculty of Arts and Science in Calgary who have shown the highest distinction in scholarship.

The Board of Governors of the University Scholarship of the value of $100.00 is awarded to the student with the highest standing in the first year in Arts and Science, Calgary, provided that an average of not less than 75% be obtained on the work of the year.

The Great Books Awards—will be awarded annually to two graduating students from the Faculty of Arts and Science at the University of Alberta, Calgary; one to a B.Sc. graduate with high standing in arts courses and one to a B.A. graduate with high standing in science courses. These awards are donated by Encyclopaedia Britannica of Canada Ltd. and each consists of a 54-volume set of the Great Books of the Western World.

The St. Hilda's Undergraduate Scholarship of $400 is provided annually by the St. Hilda's Trust Fund for a woman student of outstanding merit completing the first year and entering the second year of the Faculty of Arts and Science at the University of Alberta, Calgary.

Preference will be given to any applicant who is a graduate of St. Hilda's School for Girls or a descendant of any such graduate, or of a graduate of St. Hilda's College. Applicants with these qualifications must state so in a separate letter attached to the regular university scholarship application form. If no such candidate applies the award may be given to any woman student who fulfills the other conditions.

Apply to the Administrator of Student Awards by June 15.

The Society of Arts and Science, Calgary Scholarships. The Society will offer one or more scholarships of $250.00 each, annually to an outstanding student or students who are members of the Society and who are enrolled in the Faculty of Arts and Science at the University of Alberta, Calgary. The basis of award will be (a) academic standing (b) contribution to extra-curricular life on the campus and (c) financial need. The award will be dependent on returning to the Calgary campus for the following academic year.

Recommendations will be made by the Executive of the Society to the Scholarship Committee of the University of Alberta, Calgary.

The University Women's Club of Calgary Scholarship of $300.00 tenable at the University of Alberta is open to women students at the University of Alberta, Calgary who have completed the first year of Arts and Science. To be eligible for the scholarship a student must have an average of at least 75% on the year's work.

AWARDS IN DEPARTMENTS

(**Note:** Awards in specified courses are open to students of other faculties registered in these courses.)

Biochemistry

The Society of Chemical Industry Merit Awards. Three awards will be made annually consisting of a gold key bearing the crest of the Society and a year's subscription to "Chemistry and Industry". The awards will be made to the student graduating with the highest standing in each of Honors Chemistry, Honors Biochemistry and Chemical Engineering, provided an average of 75% is attained in the final year and that the program has been completed in the normal number of years.

Botany

The J. E. Olsen Prize, of the value of $35.00, is offered to the graduating student who has taken the highest average mark in two or more senior botany courses, provided that the student's general record is satisfactory to the Faculty Council.

The Kiwanis Club of South West Calgary Prize of $50.00 will be awarded to a student at the University of Alberta, Calgary, for outstanding merit in Agriculture or Botanical Science.

Chemistry

The Professor Osman James Walker Memorial Scholarship of $100 is awarded annually to the student selected by the Department of Chemistry at Edmonton who is graduating from the University of Alberta in the general or honors program and who will be proceeding to graduate work in the Department of Chemistry at the University of Alberta. Applications for this award must be received by the Department before May 1.

In the event that no suitable applicant is selected, the award will go to the student graduating with the highest record in the fourth year of the honors chemistry program.

The Cave and Company Ltd., Scholarship in Chemistry of the value of $150 is awarded annually to a student selected by the Department of Chemistry at Edmonton who is graduating from the University of Alberta in the general program or honors program or in Chemical Engineering, and who will be proceeding to graduate work in the Department of Chemistry at the University of Alberta. Applications for this award must be received by the Departmnt before May 1.

In the event that no suitable applicant is selected, the award will go to the student in the third year of the honors Chemistry program, with the highest academic standing.

The Society of Chemical Industry Merit Awards. Three awards will be made annually consisting of a gold key bearing the crest of the Society and a year's subscription to "Chemistry and Industry". The awards will be made to the student graduating with the highest standing in each of Honors Chemistry, Honors Biochemistry and Chemical Engineering, provided an average of 75% is attained in the final year and that the course has been completed in the normal numbers of years.

The Chemical Institute of Canada Prizes in Chemistry. A prize of $25 in books will be awarded to the student in Edmonton and the student in Calgary in Honors Chemistry who obtain the highest standing in the work of the third year, provided that such students' records are otherwise satisfactory to the Faculty Councils.

The Lehmann Prize in Chemistry, of the value of $25.00 in books, is offered annually by the estate of the late Dr. A. L. F. Lehmann, formerly head of the Department of Chemistry in the University. It is awarded to the student making the best record in Chemistry 230 in Edmonton, provided the student otherwise secures a standing satisfactory to the faculty council.

The Paul Edward Macleod Memorial Prize in Chemistry of the value of $25.00 was provided by the late Mrs. J. E. A. Macleod, Calgary, in memory of her son, who died while a student of the university. The award will be made to the student obtaining the highest standing in organic chemistry (Chemistry 250), in Calgary, provided the student's record is otherwise satisfactory.

The Fred H. Irwin Memorial Prize in Organic Chemistry—As a memorial to their son, Flying Officer Fred H. Irwin, a graduate in Honors Chemistry of the University of Alberta, May 19, 1941, who lost his life March 19, 1945, while on operations, Mr. and Mrs. Leslie H. Irwin have made provision for an annual prize of $25.00 in professional books to be awarded to the student making the best record in Chemistry 550 in Edmonton.

The Dr. O. J. Walker Memorial Prize, of $25.00 in books, is offered by the Alumni of Phi Delta Theta Fraternity to a student of outstanding merit in Chemistry 312 (Quantitative Analysis) in Edmonton, provided the student's record is otherwise satisfactory.

Classics

The Ahepa Prize in Greek—A prize of $50.00 is offered by the Anglo-Hellenic Association in Western Canada to the student in Greek 200 or Greek 300 who secures the highest standing in a special examination in sight translation from English to Greek and from Greek to English, subject to the provision that the prize be granted to the successful candidate only if he or she continues in a course in senior Greek in the year immediately subsequent to the year in which the prize is won. If there is no suitable candidate from Greek 200 or Greek 300, the Department of Classics may at their discretion award the scholarship to a student in other courses in Greek.

The Senior Greek Prize of $75.00 is awarded to the student in Edmonton who ranks highest in the examinations in Greek 382, 383 or 384, whichever is offered, provided that the student achieves first class standing in the course concerned, and that his record is otherwise satisfactory to the Faculty Council.

The Monica Jones Aamodt Prize in Classics in English 350, of $25.00 in books, is offered annually by the Delta Delta Delta Alumnae of the University of Alberta in honor of Mrs. Monica Jones Aamodt, the organizer of the fraternity on this campus. The prize is to be awarded to the student in Edmonton obtaining the highest mark in that course, provided that the standing obtained meets with the approval of the Faculty Council.

Economics

The Duncan Alexander MacGibbon Gold Medal in Economics will be awarded to the student graduating from the Honors Economics program with highest distinction.

The Men's Economics Club Book Prize, valued at $25.00, is offered to the student taking the highest standing in Economics 200 at Edmonton, provided such student's academic record is satisfactory to the Faculty Council.

English

The Rutherford Memorial Gold Medal—is offered in memory of the late Honorable Alexander Cameron Rutherford to a student of outstanding merit in the graduating year who attains first class standing in honors English.

The Aiken Scholarship in English Language and Literature, of the value of $100, is the gift of the late Sir James Aiken. The scholarship will be awarded to a student of outstanding merit who is entering the third year of the honors English program. In no English course may the student fall below second-class standing.

The Priscilla Hammond Memorial Scholarship in Honors English, of the value of $500.00, is awarded to the student entering upon his or her final year in honors English who, in the judgment of the Department of English, shows the greatest ability and promise in the field of English scholarship or in creative work in English. The right is reserved to withhold the scholarship in any given year if there is no candidate satisfactory to the department.

The F. M. Salter Memorial Scholarship in Renaissance Literature of $100, made available by friends of the late Dr. Salter, will be offered to a student in Edmonton for outstanding merit in English 324 or 332 or 390 provided that the student's academic record is otherwise satisfactory.

The James Patrick Folinsbee Prize of the value of $100.00 is offered annually to the student in English 396 whose writing shows greatest merit provided the student's general University record is satisfactory.

The Samuel Richard Hosford Memorial Prize, of $50.00 is awarded to the undergraduate student making the best record in English 332.

The Priscilla Hammond Memorial Prize in English 200, of the value of $15.00 in books, is offered annually by Delta Gamma Fraternity, in honor of their first president to the undergraduate student making the best record in English 200, provided the student's record is otherwise satisfactory.

The Calgary Herald Prize in English 240, of $50.00 is awarded to a student in the University in Calgary for outstanding merit in English 240 providing the student secures first class standing in English 240 and is carrying a full year's work in which his standing is satisfactory to the faculty council.

The Charles James Thompson Memorial Prize in English 210, of the value of $10.00 in cash is awarded to the undergraduate student in the Faculty of Agriculture making the best record in English 210, provided that the student is taking a full year's work and passes all subjects.

Beta Sigma Phi, Canadian Chapter offers annually three scholarships of $1,000.00 each, one of which is restricted to the Western Canada region. The scholarships will be tenable in the fourth year of an Honors Course in English. They will be awarded at the end of the third year on a basis of academic accomplishment and a confidential assessment of the student's ability by his or her teachers in English courses.

Entomology

The Entomological Society of Alberta Prize—An annual prize of $50.00 is offered by this Society to the student obtaining the highest standing in one or more senior courses in the Department of Entomology. The Award is conditional on a satisfactory general record.

Fine Arts

The Fuller Brush Company Scholarship in Art—One scholarship of $200.00 will be awarded to a student of outstanding merit in Edmonton, who is entering either the second or third year of the B.A. in Art or the Bachelor of Fine Arts, or the third or fourth year of the Faculty of Education, majoring in Art, provided that such student is registered in a full year's program.

The University of Alberta Alumni Prize in Fine Arts of $100.00 is offered annually by the General Alumni Association to the student in the B.A. in Art or the Bachelor of Fine Arts in Edmonton who has demonstrated the best progress. Financial need will be considered in making the award.

The Lerner Scholarship in Drama—A scholarship of $100.00 is offered annually by Mr. A. I. Lerner, in memory of his son, Irving Lerner. It is awarded to a student of outstanding merit enrolled in Drama 350 (Advanced Acting). To be eligible, a student must be majoring in Drama in the Faculty of Arts or Education. The payment of this scholarship will be contingent upon the student's entering a further year of training in drama either at the University of Alberta or at another recognized college or university.

Apply to The Secretary, Canadian Universities Foundation, 75 Albert Street, Ottawa 4, Ontario, by June 1. For further information refer to Administrator of Student Awards, University of Alberta.

The Peace River Pioneer Memorial Scholarship in Music of $200.00, endowed by Mr. Charles Plavin of North Star, Alberta, will be awarded annually to a student of outstanding merit completing the first or second year of the Bachelor of Music program at the University of Alberta, Edmonton. The Department may, at its discretion, divide the award. It is hoped that recipients of these scholarships will be interested in music instruction for school age children.

The Alberta Piano Company Scholarship in Music of $100.00 is offered annually to a student of outstanding merit completing the first or second year of a Music program at the University of Alberta, Calgary.

The Bob Ingles Music Shop Scholarship of $100 will be offered annually to a student in the Department of Music at the University of Alberta, Calgary for outstanding achievement on one or more musical instruments.

The Eva Shaw Memorial Prize in Music of the value of $50.00 is offered annually in memory of the late Mrs. Roy Shaw, by her children, to a student of outstanding merit in any year of the Bachelor of Music program in Edmonton.

The Elizabeth Sterling Haynes Memorial Scholarships are offered by the Canadian Women's Theatre Guild. Two scholarships of $150.00 each are available in theatre art (directing, playwriting, acting, stagecraft) to students

18 years of age or over enrolled at the University of Alberta in Edmonton or residents of the city.

Application forms should be received by the chairman of the Scholarship Committee, Miss Ruth Hyndman, 11131 - 82 Ave., Edmonton, on or before April 15.

Geography

The Canadian Association of Geographers' Book Prize—An award will be granted annually to the graduating student who has specialized in Geography and who has demonstrated the greatest proficiency in this subject.

The Alberta Geography Prizes are offered annually by Mr. Donald C. Lofquist, M.A. as follows:

1. One prize of the value of $25.00 in books, and a one-year student membership in the Canadian Association of Geographers, to be awarded to the freshman student receiving the highest mark in Geography 201, in Edmonton or Calgary, provided the student is carrying a full year's work and passes in all other subjects.
2. One prize of the value of $50.00 in cash, and a one-year student membership in the Canadian Association of Geographers, to be awarded to the second year student in Edmonton specializing in Geography who receives the highest mark in Geography 300 and Geography 301, provided the student is carrying a full year's work and passes in all other subjects.
3. One prize of the value of $50.00 in cash, and a one-year student membership in the Canadian Association of Geographers, to be awarded to the third year student in Edmonton specializing in Geography and who has shown the greatest proficiency in Geography provided the student is carrying a full year's work and passes in all other subjects.

Geology

The Association of Professional Engineers of Alberta Gold Medal in Geology is offered to the student with the highest general standing in the final year of Geology. This award may be given to a student graduating in either the three year general course or the four year honor course, provided that an average standing of at least 75% is attained.

The Dome Petroleum Limited Scholarship of $500.00 is offered annually to a student of outstanding academic merit entering the third year of an Honors program in Geology at the University of Alberta. The student must have attained 75% or better in his second year.

The Socony Mobil Oil of Canada Ltd. Scholarship in Geology, consisting of a scholarship of $400 to the student selected and a grant of $400 to the Department in which the student is registered, is offered to a student entering the third year in Honors Geology upon the basis of outstanding merit in his previous academic record, and evidence of initiative and good character.

The California Standard Company Scholarship in Geology of $400 is offered annually to a student of outstanding merit entering the final year of Honors

Geology who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

Apply to the Administrator of Student Awards by June 15.

The John A. Allan Memorial Scholarship in Geology of the value of tuition and fees is offered annually by the Association of Professional Engineers of Alberta in memory of Profsesor John A. Allan. The award will be made to the student who obtains the highest average standing in all the prescribed courses of first year Geology.

The P. S. Warren Prize in Geology of $100, provided by the Edmonton Geological Society, will be awarded to a non-graduating student for outstanding achievement in Geology 201 at Edmonton, provided the student's record is otherwise satisfactory.

The Alberta Society of Petroleum Geologists' Prize in Stratigraphy is offered annually to the undergraduate student, who, in the opinion of the Department of Geology, has made the most progress in the study of stratigraphical geology. The prize will consist of a copy of "The Western Canada Sedimentary Basin" and a gift certificate entitling the recipient to his selection of the Society's publications to the value of $50.00.

The George E. Cole Memorial Prize in Economic Geology of $25.00 is offered annually by Mrs. Janet C. Cole in memory of her late husband, a former President of the Canadian Institute of Mining and Metallurgy, to the student obtaining the highest standing in Geology 460, provided that the student obtains at least 75% in the subject and is registered in a full year's program.

Germanic Languages and Linguistics, Edmonton

The German Government Prizes (Edmonton) in books are offered annually to the two senior students with outstanding merit in German 370 and 400 or 450, whichever is offered, provided that these students obtain an average of not less than 75% in these courses, are carrying a full year's work and have a record satisfactory to the Faculty Council. A prize may not be awarded to the same student more than once.

The Minister of Switzerland's Book Prize in German (Edmonton) is offered to the student who obtains the highest standing in German 380 or 350, providing such student's record is otherwise satisfactory.

History

The Harold W. Riley Memorial Scholarship of $200 will be offered annually to a student of outstanding merit in the Department of History who has shown a special interest in the history of Western Canada, provided his record is otherwise satisfactory.

The John Henry Stanley Memorial Prize, of the value of $25.00 in books, is offered annually by Dr. George F. G. Stanley in memory of his father to be awarded annually to the student standing highest in Canadian History, provided this student is taking a full year's work and passes all other subjects.

The Gordon Stanley Fife Memorial Prize of $100, provided by members of

the family, will be awarded to the graduating student at Edmonton who has taken the highest average mark in two or more senior history courses.

The George Malcolm Smith Memorial Prize of the value of $25.00 in books is offered annually by Professor Emeritus M. H. Long in memory of his former colleague, to be awarded to the student standing highest in Modern European History at Edmonton provided that this student takes first-class standing in the course, is carrying a full year's work and passes in all his other subjects.

The History Club Prize of books of the value of $25.00 is offered by the History Club of the University of Alberta, to the student making the best record in a junior History course in Edmonton, provided such student receives first-class standing on the year's work in history and passes in all other subjects.

The A. L. Burt Prize of books of the value of $25.00 is offered by the History Club in honor of its founder, to the student making the highest standing in History 450 in Edmonton, provided that the student's general record is satisfactory to the Faculty Council.

The Trenholme Dickson and Letitia S. Dickson Prize of $35.00 is awarded to the student with the highest standing in the field of Canadian History, at Edmonton provided such student has a first-class average in that subject and maintains an otherwise satisfactory standing.

The Morden Heaton Long Prize, of the value of $25.00, is offered annually by his friends. It will be awarded to the student at Edmonton with the highest standing in British History, provided that this student takes a first-class standing in the course, is carrying a full year's work and passes in all his other subjects.

The Calgary Canadian Club History Prize of $25.00 is awarded to the student who achieves the best record in any History course given at the University of Alberta, Calgary, provided that the student is registered in a full program of studies, that his mark in History is not lower than 75% and that he does not qualify for another award in the same subject.

Mathematics

The A. Wyman Memorial Gold Medal in Mathematics is offered by the family of the late Mr. Wyman to the student in the graduating year of the honors program in Mathematics who secures the highest average standing, provided that the student's record is otherwise satisfactory.

Smalley's Radio Ltd. Bursary in Arts and Science of the value of $500.00 is offered annually by Smalley's Radio Ltd. of Calgary to a student completing first year and continuing on to second year at the University of Alberta, Calgary in Honors Physics or Honors Mathematics. The award will be based on scholastic standing and financial need.

Apply to the Administrator of Student Awards by June 15.

The Cyril G. Wates Memorial Prize of $50.00, offered by Mrs. Wates, will be awarded to a student of outstanding merit in Astronomy 253 or 410. The award will be based on the record in these courses only.

The Ernest Wilson Sheldon Memorial Prize in Mathematics, of the value of $50.00, is offered by Mrs. Sheldon in memory of the late Dr. E. W. Sheldon, Emeritus Professor of Mathematics to a student of outstanding merit completing the third year of honors program in mathematics at Edmonton, provided his general record is satisfactory to the Faculty Council. The award will be based on performance in the mathematics courses of the third year.

The J. W. Campbell Memoral Prize of $50 provided by Mrs. J. W. Campbell in memory of her husband, former Head of the Department of Mathematics, will be awarded annually to a student of outstanding merit in Mathematics 206 in Edmonton provided that the student's record is otherwise satisfactory to the Faculty Council.

The Annie Fefferman Prize in Mathematics to the value of $25.00 in books is offered by the family of the late Mrs. Fefferman to the student making the highest standing in Mathematics 201 in Edmonton provided that the student's general record is satisfactory to the Faculty Council.

Modern Languages, Calgary

The Beauchemin Prize in French valued at $25.00 is offered by Dr. L. O. Beauchemin to the student attending the University in Calgary who achieves the highest standing in French 200, providing such student's record is satisfactory to the Faculty Council concerned.

The Bronze Medal in French (Calgary) offered by the French Consul in Alberta, will be awarded annually to a student who achieves outstanding merit in French 380 or French 450, providing the student's record is otherwise satisfactory to the Faculty Council.

The French Government Book Prize (Calgary) will be awarded to a student for outstanding merit in French 200, providing such student's record is otherwise satisfactory.

The Belgian Government Book Prize (Calgary) is offered to the student who obtains the highest standing in French 360 or French 400, providing that the student's record is otherwise satisfactory to the Faculty Council.

The Swiss Government Book Prize in French (Calgary) will be offered for the highest standing in French 370 or 375 at Calgary provided the student's record is otherwise satisfactory.

The Swiss Government Book Prize in German (Calgary) will be offered for the highest standing in German 372 or 380 at Calgary provided the student's record is otherwise satisfactory.

The German Government Book Prizes (Calgary) will be awarded to two students for outstanding merit in German 372 or 380 and in German 400 or 450. A prize may not be awarded to the same student more than once.

Philosophy

The MacEachran Gold Medal in Philosophy, offered by Professor Emeritus J. M. MacEachran, will be awarded to the student in the Department of Philosophy graduating with Honors in Philosophy or Philosophy and Greek with the highest standing in the last two years of the course. The medal will be awarded only if the student obtains First Class Honors.

The William Irvine Memorial Scholarship in Ethics of $100 made available by friends of the late Mr. Irvine will be offered to a student in Edmonton for outstanding merit in Philosophy 354 provided that the student's academic record is otherwise satisfactory.

Physics

The Sam Fefferman Memorial Gold Medal in Honors Physics is offered by the family of the late Mr. Fefferman to an outstanding student in the graduating year of the honors program in Physics. The student must have registered in a full year's program and obtain first class honors in Physics.

The Association of Professional Engineers of Alberta Gold Medal in Geophysics is offered to the student with the highest standing in the final year of Geophysics, provided that an average of at least 75% is attained.

The Association of Professional Engineers of Alberta Scholarship in Physics and Geology of the value of tuition and fees is offered annually to a student of outstanding merit entering the third year of a program at the University of Alberta leading to a B.Sc. (Honors) in Physics and Geology.

Smalley's Radio Ltd. Bursary in Arts and Science of the value of $500.00 is offered annually by Smalley's Radio Ltd. of Calgary to a student completing first year and continuing on to second year at the University of Alberta, Calgary in Honors Physics or Honors Mathematics. The award will be based on scholastic standing and financial need.

Apply to the Administrator of Student Awards by June 15.

The California Standard Company Geophysical Scholarship, valued at $400 is offered annually by the California Standard Company to a student of outstanding merit who is entering the third year of honors Physics and Geology, or Engineering Physics (Geophysics option), and who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

Apply to the Administrator of Student Awards by June 15.

The Society of Exploration Geophysicists Scholarships. See details under Matriculation Scholarships.

The Royal Canadian Legion Scholarship in Physics or Electrical Engineering of $400 is offered annually in the field of Physics or Electrical Engineering.

The terms of award are otherwise the same as for the Royal Canadian Legion Scholarship—see Matriculation Awards.

Apply to the Administrator of Student Awards by June 15.

The Northern Electric Undergraduate Scholarship, which provides an amount not exceeding $500 to cover tuition and general fees and the cost of books for one year, is awarded annually to a student of outstanding merit who is proceeding into the second, third or fourth year of Electrical Engineering, Engineering Physics or Honors Physics. The applicant must be a Canadian citizen or a landed immigrant and must normally have secured an average of at least 75% on the work of the preceding university year. Students who have held the scholarship previously are free to apply for renewal of the award.

Apply to the Administrator of Student Awards by June 15.

Political Science

The Duncan Alexander MacGibbon Gold Medal in Political Science will be be awarded to the student graduating from the Honors Political Science program with highest distinction.

Psychology

The MacEachran Gold Medal in Psychology, offered by Professor Emeritus J. M. MacEachran, will be awarded to the student in the Department of Psychology, graduating in the B.A. or B.Sc. course with Honors in Psychology with the highest standing in the last two years of the course. The medal will be awarded only if the student obtains First Class Honors.

Romance Languages, Edmonton

The Aristide Blais Prize in French—A prize of $25.00, the gift of Senator Blais, is to be awarded annually to an undergraduate fluent in the French language who obtains the highest first-class standing in French 400 at Edmonton. The prize may not be awarded to the same student more than once, and in the event of a student qualifying for the prize a second time it may be awarded by reversion to another student with first-class standing in French 400.

The Bronze Medal in French (Edmonton), offered by the French Consul in Alberta will be awarded each year to the student of French 450 who writes the best essay on a contemporary author.

The French Government Book Prize (Edmonton) will be awarded to the student with the highest standing in French 200, provided such student's record is satisfactory to the Faculty Council.

The Belgian Government Book Prize (Edmonton) is offered to the student who obtains highest standing in French 360, provided that the student's record is otherwise satisfactory.

The Minister of Switzerland's Book Prize in French (Edmonton) is offered to the student who obtains the highest standing in French 375 or 380, provided that the student secures standing which is satisfactory to the Faculty Council.

Slavic Languages, Edmonton

The Russian Literature Book Prizes offered by an anonymous donor, will be awarded to two students of outstanding merit, one in Russian 350 and one in Russian 360.

The Canadian Legion, Norwood Branch, Scholarships in Ukrainian. Five scholarships annually of the value of $100 each, will be awarded to students of outstanding merit, three in Ukrainian 100 and two in Ukrainian 300, the awards to be based on the mark of these courses only.

The Ukrainian Catholic Women's Award in the Ukrainian Language of the value of $100.00 is awarded to the student with the highest standing in Ukrainian 100 provided the student's record is otherwise satisfactory to the Faculty Council.

The Ukrainian Women's Association of Canada (Alberta Branch) Scholarship of $100.00 is offered annually to a student of outstanding merit in Ukrainian 300 provided the student's record is otherwise satisfactory.

The Ukrainian National Association Scholarship of $100.00 is offered annually to a student of outstanding merit in Ukrainian Literature 360 provided the student's record is otherwise satisfactory.

The Polish Canadian Congress of Alberta Scholarship of $100.00 is offered annually to a student for outstanding merit in any Polish language course at the University of Alberta provided his record is otherwise satisfactory to the Faculty Council.

Sociology and Anthropology

The Samuel M. Strong Gold Medal and Prize in Sociology, in memory of the late Dr. Strong, will be awarded to the student in the Department of Sociology and Anthropology graduating with Honors in Sociology with the highest standing in the last two years of the course. The medal will be awarded only if the student obtains First Class Honors.

Zoology

The William Rowan Memorial Scholarship of $100.00, in memory of the late Dr. Rowan, former Head of the Department of Zoology, will be offered annually to a student of outstanding merit entering the fourth year of the Honors Zoology program.

THE FACULTY OF AGRICULTURE

The Alberta Institute of Agrologists Gold Medal is offered annually primarily on the basis of scholarship as shown in the two senior years in the undergraduate courses in Agriculture, the weighted average in all subjects to be not less than 75%. Consideration will be given as well to qualities of leadership, personality and character.

The Board of Governors of the University Scholarship of the value of $100.00 is awarded on the basis of the work of the first year in Agriculture, provided that an average of not less than 75% be obtained on the work of the year.

The Dan Baker Undergraduate Bursary of $300 is provided under the will of the late Dan Baker of Edmonton. It may be awarded to a student entering second, third or fourth year of the Faculty of Agriculture on a basis of academic standing, financial need and personal character.

Apply to the Administrator of Student Awards by June 15.

Loveseth Limited Scholarships in Agriculture—Four scholarships of $250.00 each are offered annually by Loveseth Limited to students of outstanding merit completing first, second or third year Agriculture at the University of Alberta in Edmonton.

The Douglas Farquhar Johnston Bursaries in Agriculture of the value of $500 each are offered annually to two students entering the final year of the Faculty of Agriculture. Preference will be given to students in the Department of Animal Science. The awards will be based on academic standing and financial need.

Apply to the Administrator of Student Awards by June 15.

The Alberta Dairymen's Association Scholarship in Dairy Science of the value of $500.00 is open to undergraduates who have completed the second year in the Faculty of Agriculture and who are registered in a special program in the Department of Dairy Science. The award will be for scholarship attainment during the first two university years with a two-year average of not less than 65%. The scholarship may be renewed during the fourth year for continued meritorious work.

The Alberta Dairymen's Association Summer Work Awards. Two awards of the value of $150 each are available annually to students who express an intention to specialize in Dairy Science and who, within the previous three years, have completed a summer's work in the dairy industry. These awards are available to students entering the first, second and third years in Agriculture.

The Alberta Provincial Milk and Cream Producers' Association Scholarship of $250.00 is offered to a student completing the second year of the Faculty of Agriculture and entering the Department of Dairy Science in the third year. The award will be for scholarship attainment during the first two years with a two-year average of not less than 65%.

The J. K. Sutherland Memorial Scholarship of the value of $100.00 is offered in memory of Mr. and Mrs. Sutherland of Hanna, Alberta, by the Board of F.U.A. District No. 11 and other interested persons. It is to be awarded to a student of outstanding merit completing the third year of the Faculty of Agriculture in the University of Alberta, provided that an average of at least 70% has been obtained in that year.

The Canada Packers Scholarship, valued at $500, is offered annually to a student entering the fourth year of Agriculture at the University of Alberta. While preference may be given to a student majoring in a field of general interest to the packing industry, all students with high standing in the work of the third year will be eligible.

The Canadian Feed Manufacturers' Association (Alberta Division) Scholarship of $300.00 is available to a third year student in Agriculture majoring in nutrition in the Department of Animal Science in the third year. The scholarship is to be awarded to the eligible student who has the highest weighted average in courses completed during his second year in the Faculty of Agriculture.

The Alberta Branch of the Canadian Seed Growers' Association Scholarship of $150.00 is made available to a third year student in the Department of Plant Science. The scholarship is to be awarded to the eligible student who has the highest weighted average in courses completed during his second year in the Faculty of Agriculture.

The Robert Gardiner Memorial Undergraduate Scholarship of $200.00 offered by the United Farmers of Alberta in memory of the late Robert Gardiner, will be awarded to the student standing highest in the third year in the Faculty of Agriculture. A weighted average of 75% in all subjects will constitute the minimum scholastic requirement. In addition to academic standing, consideration will be given to qualities of leadership, personality and character.

The scholarship is open only to students from farm homes; preference will be given to students born in Alberta.

The Renkenberger Scholarship—See details under Faculty of Arts.

The Alberta Horticultural Association Scholarship of $100 will be awarded annually to a student of outstanding merit entering the 3rd or 4th years of the Department of Plant Science and specializing in Horticulture.

The Ketchum Prize in Animal Science, valued at $50.00, is offered by the Ketchum Manufacturing Co. Limited of Ottawa. It will be awarded to a student majoring in Animal or Poultry Husbandry for outstanding merit in the work of the third year in the Faculty of Agriculture.

The Entomological Society of Alberta Prize—An annual prize of $50.00 is offered by this society to the student obtaining the highest standing in one or more senior courses in the Department of Entomology. The award is conditional on a satisfactory general record.

The Kiwanis Club of South West Calgary Prize of $50.00 will be awarded to a student at the University of Alberta, Calgary, for outstanding merit in Agriculture or Botanical Science.

The Charles James Thompson Memorial Prize in English 210—See details under Awards in Departments.

THE FACULTY OF COMMERCE

The T. Eaton Company Gold Medal in Commerce is awarded annually to the graduating student who receives the highest standing in the courses of the final two years, providing the student's record is considered satisfactory by the Faculty of Commerce.

The Winspear, Higgins, Stevenson and Doane Scholarship of the value of $500.00 is offered annually to a student at the University of Alberta proceeding to the degree of Bachelor of Commerce in Accounting for outstanding merit in the courses of the first and second years. The scholarship will be paid in two equal instalments; the first on registration in the third year and the second on registration in the fourth year. Payment of the second instalment is subject to the student obtaining an average of a least 70% in the courses of the third year.

The Dominion Stores Limited Scholarship of the value of $500.00 is offered annually to a student at the University of Alberta proceeding to the degree of Bachelor of Commerce in Finance for outstanding merit in the courses of the first and second years. The sholarship will be paid in two equal instalments; the first on registration in the third year and the second on registration in the fourth year. Payment of the second instalment is subject to the student obtaining an average of at least 70% in the courses of the third year.

The Industrial Acceptance Corporation Limited Scholarship of the value of $500.00 is offered annually to a student at the University of Alberta proceeding to the degree of Bachelor of Commerce (General Course) for outstanding

merit in the courses of the first and second years. The scholarship will be paid in two equal instalments; the first on registration in the third year and the second on registration in the fourth year. Payment of the second instalment is subject to the student obtaining an average of at least 70% in the courses of the third year.

The Frederick Charles Manning Memorial Scholarship of $250.00 is offered in memory of their father by Mrs. F. Armour (Manning) Ford, Alberni, B.C., Mr. F. C. Manning, Calgary, Alberta, and Mr. A. H. Manning of Calgary, Alberta. The scholarship will be awarded on a basis of academic merit and extra-curricular activities to a student completing the first or second year of the Faculty of Commerce at Calgary. The recipient will be expected to continue in the Faculty at Calgary if his program is available there.

The Renkenberger Scholarship—See details under Faculty of Arts.

The Aluminum Company of Canada, Limited, Scholarship. See details under Faculty of Arts.

The Institute of Chartered Accountants of Alberta Scholarships of $150.00 each will be awarded to two students of outstanding merit entering the third year of the Bachelor of Commerce program in Accounting, one to be based on the work of the first two years at Edmonton and one on a similar basis at Calgary.

The Clarkson, Gordon and Co. Prize of $50.00 will be awarded annually to a student entering the second year in the Faculty of Commerce based on the results of Accounting 200 of the first year providing the student's record is otherwise satisfactory to the Faculty.

The Christenson, Morrison and Co. Scholarship of the value of $300.00 is offered annually to a student at the University of Alberta proceeding to the degree of Bachelor of Commerce in Accounting for outstanding merit in the courses of the first and second years. Character and general ability of the student will also be considered. The scholarship will be paid in two equal instalments; the first on registration in the third year and the second on registration in the fourth year. Payment of the second instalment is subject to the student obtaining an average of a least 70% in the courses of the third year.

The Business and Professional Women's Club, Edmonton Branch, Scholarship in Commerce of the value of $100.00 is offered annually to an undergraduate woman student of outstanding merit in the Faculty of Commerce, University of Alberta, Edmonton. The award may be made to a student in any year except her graduation year and shall be based on her performance in the year which she has just completed.

The Lennie M. McNeill Memorial Scholarship of $100.00 provided by the Soroptimist Club of Edmonton is offered annually to an undergraduate woman student of outstanding merit in the Faculty of Commerce, University of Alberta, Edmonton. The award may be made to a student in any year except her graduation year and shall be based on her performance in the year in which the award is made.

The T. Eaton Co., Ltd., Edmonton, offers two book prizes as follows:

A prize of books to the student securing the highest standing in the courses of the first year.

A prize of books to the student securing the highest standing in the courses of the second year.

In both instances the award will be subject to the student's record being considered satisfactory by the Faculty of Commerce.

The Edmonton Personnel Association Prizes of $25.00 each are offered to three students in the Faculty of Commerce at Edmonton for outstanding merit in Personnel 302, 410 and 420 respectively, provided the students' records are otherwise satisfactory.

The Calgary Personnel Association Prize of $50.00 will be awarded annually to a student in the Faculty of Commerce for outstanding merit in Personnel 302 or 410, provided his record is otherwise satisfactory to the Faculty Council.

The Riddell, Stead, Graham and Hutchison Scholarship of $300 will be awarded annually to a student of outstanding merit entering the final year of the program towards a Bachelor of Commerce in Accounting, who has indicated an intention to proceed into chartered accountancy after graduation. The Faculty will make the selection on a basis of academic record and personal suitability for the profession.

The Touche, Ross, Bailey and Smart Scholarship of $300 will be awarded annually to a student of outstanding merit entering the final year of the program towards a Bachelor of Commerce in Accounting who has indicated an intention to proceed into chartered accountancy after graduation. The Faculty will make the selection on a basis of academic record and personal suitability for the profession.

Hudson's Bay Company Tuition Awards in Commerce. Two awards of the value of tuition and fees for fourth year Commerce are offered by Hudson's Bay Company, Edmonton, to two students who have an interest in a career in merchandising. The basis of award will be high academic standing and promise of executive leadership ability. They will be offered full-time employment during the summer preceding the fourth year.

Apply to the Dean of Commerce by February 15.

THE FACULTY OF DENTISTRY

The Alberta Dental Association Gold Medal is awarded to a student for outstanding merit in the work of the fourth year, provided that the year average is not less than 75%.

The Arthur D. Cumming Gold Medal is awarded annually to a graduating student in Dentistry for outstanding merit in Dentistry for Children, provided that the final year's average is not less than 75%.

The International College of Dentists (Canadian Section) Scholarship in Dentistry, valued at $100.00, is offered annually to a student completing the

third year of Dentistry. The basis of award will be outstanding merit in the third year, general character and participation in extracurricular activities.

The Alberta Dental Association Scholarships are three in number of the value of $200.00 each, and will be awarded as follows:

1. One to a student for outstanding merit in all courses of the first year.
2. One to a student for outstanding merit in all courses of the second year.
3. One to a student for outstanding merit in all courses of the third year.

The Alberta Dental Association Prize of the value of $50.00 is awarded to a student of outstanding merit in the work of the second year, provided that the year average is not less than 75%.

The Calgary and District Dental Society Scholarship of the value of $100.00 is offered annually to a student entering third year, who shows outstanding merit in the basic science courses of the first two years of Dentistry, provided that his overall average in Anatomy, Bacteriology, Biochemistry, Physiology and Pathology is 75% or higher.

The Edmonton and District Dental Society Prizes of $100 each are offered as follows: (a) for outstanding merit in the first year, (b) for outstanding merit in the third year, (c) the Dr. B. Shlain prize for outstanding merit in Periodontia in the graduating year. In all cases an average of 75% must have been achieved. General character and interest in student activities may be taken in consideration.

The Arthur D. Cumming Scholarships are offered annually as follows:

—$200.00 to a student entering first year Dentistry for outstanding merit in the pre-professional studies at the University of Alberta, provided that an average of 70% has been attained.
—$200.00 to a student of outstanding merit entering the second year of Dentistry.
—$275.00 to a student of outstanding merit entering the third year of Dentistry.

The Alberta Dental Association Scholarship of the value of $300.00 is offered annually to a student of outstanding merit in the pre-professional course at the University of Alberta, provided that the student enters first year Dentistry and that his over-all average is 70% or higher.

The Dean's Scholarship in Dentistry of $300.00, is offered by an anonymous donor to students entering fourth year Dentistry on the basis of financial need and scholarship.

Apply to the Administrator of Student Awards by June 15.

The Dr. R. R. McIntyre Memorial Scholarship of $200, provided by the Calgary and District Dental Society, will be awarded annually to a student completing third year Dentistry for outstanding merit in Interceptive and Preventive Orthodontics providing an academic standing of at least 75% has been attained on the whole year's work.

The College of Dental Surgeons of Saskatchewan Scholarship of the value of $150.00 is offered annually to a student of outstanding merit entering the fourth year of Dentistry.

The Elizabeth and Wesley Haynes Prize of $50.00 is offered to a student of outstanding merit in the pre-professional studies at the University of Alberta, who has registered in the Faculty of Dentistry.

The Harry Ernest Bulyea Scholarship of the value of $100.00 is awarded by the University of Alberta Dental Alumni Association to the third-year student with the highest average mark in all courses in operative and restorative dentistry.

The Harry Alexander Gilchrist Scholarship of the value of $100.00 is awarded by the University of Alberta Dental Alumni Association to the third-year student with the highest average mark in all courses in prosthetic dentistry.

The Dental Prize for New Canadians of $50.00 is offered by Dr. J. W. Clay to a special student in the Faculty of Dentistry, for general excellence in the first year of study. A candidate for this award must be a recent immigrant to Canada, must have graduated from an overseas dental school and must have been in attendance in the Faculty of Dentistry for at least six months.

The Canadian Dental Association War Memorial Essay Prizes—Two prizes, the first of $200.00 and the second of $100.00, are offered by the Canadian Dental Association as a memorial to Canadian dentists who made the supreme sacrifice in World Wars I and II. The prizes will be awarded for the best essays written by fourth year dental students throughout Canada upon a topic to be announced in September of each year.

This essay is part of the requirements for fourth year students in the University of Alberta.

Further information may be obtained from the Dean of Dentistry or from the Administrator of Students Awards.

The Dental Faculty Class of 1950 Bursary of approximately $175.00 is offered by members of the Dental Class of 1950 to a student of outstanding merit who has completed the second year and is entering the third year in the Faculty of Dentistry at the University of Alberta. The award will be made by the Trustees of the Award Fund on the bases of academic merit and financial need.

The American Academy of Dental Medicine Award, consisting of a five year subscription to the "Journal of Dental Medicine" is made to the graduating student who has displayed the greatest interest in dental medicine during his course.

The American Society of Dentistry for Children Award, consisting of a certificate and a one-year subscription to the American Journal of Dentistry for Children, is awarded to a student of outstanding merit in dentistry for children, in the fourth year.

The Canadian Society of Dentistry for Children Certificate, is awarded on an annual basis to a student of outstanding merit in dentistry for children, in the fourth year.

The C. V. Mosby Book Awards. Four separate awards of books, each to the value of $30.00 will be awarded annually to students of outstanding merit in the Faculty of Dentistry.

The Postgraduate Scholarship Fund in Dentistry has been established through the generosity of members of the dental profession. The purpose of this fund is to assist dental graduates in pursuing postgraduate studies at other institutions in preparation for teaching. Younger persons will be given preference.

Applications should be made to the Dean. All applications must be submitted to the Council of the Faculty of Dentistry for approval.

The M. H. Garvin Scholarship Fund in Dentistry has been established by the Western Canada Dental Society to encourage and facilitate the studies or research work of undergraduates, or graduates in the most recent graduating class, of the Faculty of Dentistry.

Awards from the fund will be made on the basis of scholastic aptitude and attainment, professional and personal qualification and financial need. The amount of the awards, the frequency with which they are made, and the applicants who are to receive them will be determined by a committee consisting of the President and two vice-presidents of the Western Canada Dental Society.

Applications for grants from this fund should be made to the Dean of Dentistry.

SCHOOL OF DENTAL HYGIENE

The Dental Hygiene Gold Medal and Prize of $50.00 will be provided annually by the Alberta Dental Association to the student graduating with the highest standing from the School of Dental Hygiene.

The C. V. Mosby Book Award—A book award to the value of $30.00 will be awarded to a student of outstanding merit in the first year.

THE FACULTY OF EDUCATION

The Milton Ezra LaZerte Gold Medal and Scholarship. The gold medal is offered by the Alberta Teachers' Association to the student who has shown the highest general proficiency in the final year of the Bachelor of Education program at Edmonton. In addition a scholarship of $500 will be paid to the recipient upon his or her registration for intramural graduate study during a regular session in a university of recognized standing, provided that such study be commenced not later than two years following the award.

The Clarence Sansom Memorial Gold Medal and Scholarship. (at Calgary—Terms otherwise as above.)

The Board of Governors of the University Scholarships of the value of $100.00 each are awarded to two students on the basis of the work of the first year in Education, one in Edmonton and one in Calgary, provided that an average of not less than 75% be obtained in the work of the year.

The University Scholarship in Education of $300.00 is offered to a student of outstanding merit completing the second year of the Elementary route of the Bachelor of Education program and proceeding in the immediate next session into third year. The student must have attained an average of 75%.

Alberta Teachers' Association Scholarships to Students in Education—Four scholarships, in honor of Honorary Life Members of the Association in the amount of $500 each, are offered annually by The Alberta Teacher's Association to intramural students proceeding from the third to the fourth year of the Bachelor of Education program. The applicants for these scholarships must be bona fide residents of Alberta. Each must have a minimum average of 70 per cent and must give evidence of intention to follow teaching as a career. The scholarships are payable upon registration for intramural study in the fourth year of the Bachelor of Education program, Faculty of Education, University of Alberta, provided that study is continued at the next regular session of the University of Alberta following the award.

Application should be made to the Executive Secretary, Alberta Teacher's Association, Barnett House, Edmonton, not later than May 15.

Alberta Teachers' Association Scholarships to Teachers in the Field—Four scholarships, in honor of Honorary Life Members of the Association, each in the amount of $500, are offered annually by The Alberta Teachers' Association to teachers in the field who, having completed three years of training and holding a permanent Alberta teaching certificate, are proceeding to the fourth year in the Bachelor of Education program. Applicants for these scholarships must be bona fide residents of Alberta, must have a minimum average of 70 per cent, and must give evidence of intention to follow teaching as a career. The scholarships are payable upon registration for intramural study in the fourth year of the Bachelor of Education program, Faculty of Education, University of after the award is made.

Application should be made to the Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton, not later than May 15.

The Crown Zellerbach Canada Limited Scholarships in Education of $500.00 each are offered annually to two Canadian students of outstanding merit who hold an undergraduate degree from the University of Alberta (either Edmonton or Calgary) and who are proceeding in the Faculty of Education towards a Professional Certificate. One scholarship will be tenable at Edmonton and one at Calgary.

Apply to the Administrator of Student Awards by June 15.

Calgary Gyro Scholarship in Education of the value of $400 is offered annually to a student of outstanding merit who holds an undergraduate degree from the University of Alberta and who is proceeding in the Faculty of Education in Calgary towards a Professional Certificate.

Canadian Society of Exploration Geophysicists Scholarship in Education of $350 is offered annually to a male student entering the third or fourth year of the four year course in Education, Secondary route, with a major in Mathematics or the Physical Sciences at Calgary, or entering the Bachelor of Education course, Secondary route, at Calgary, after attaining a Bachelor's degree in Mathematics or the Physical Sciences.

Apply to Administrator of Student Awards by June 15.

The Fuller Brush Company Scholarship in Art—See details under Awards in Departments.

Century Geophysical Corporation of Canada Scholarship in Education of $500.00 is offered annually to the student graduating with the highest standing in Physics or Mathematics in Calgary or Edmonton and who is proceeding to the Faculty of Education at Calgary towards a Professional Certificate.

Apply to the Administrator of Student Awards by June 15.

The Lerner Scholarship in Drama—A scholarship of $100.00 is awarded to a student of outstanding merit enrolled in Drama 350 (Advanced Acting). See under Department of Fine Arts.

The Renkenberger Scholarship—See details under the Faculty of Arts.

The Edmonton Jewish Community Council Scholarship, of the value of $100.00, is offered annually to a student of outstanding merit in second year B.Ed. in Edmonton, with options in Household Economics. If no suitable candidate is found in this course, the scholarship will be awarded to a student of outstanding merit in the second year of any B.Ed. program.

The P.E.O. Southern Alberta Scholarship in Education, of $150.00, tenable at the University of Alberta, is open to the woman student at the University of Alberta, Calgary who achieves the best record in the first or second year of the Bachelor of Education program. To be eligible a student must have an average of at least 70% in the year's work and a generally satisfactory performance.

The Education Society of Edmonton Scholarship of $100.00 is offered annually to a student completing first year of the Bachelor of Education program in Edmonton and proceeding into second year in the succeeding academic session. The basis of award will be academic standing and promise of professional competence.

The Administrative Management Society Scholarship in Business Education of the value of $200.00 will be offered annually by the Edmonton Chapter, A.M.S., to a student of outstanding merit completing the first, second or third year of the B.Ed. program in the Faculty of Education, Edmonton who has been and will continue to be majoring in Business Education and who expresses an intention to pursue a teaching career in Business Education.

The Olive M. Fisher Prize of $50 is offered by Dr. Olive M. Fisher to a woman student at the University of Alberta, Calgary, for outstanding merit in practice teaching in the second year of the B.Ed. program, Elementary Route, or in the first year of the B.Ed. after an approved degree program, Elementary Route, provided that her course of studies has not been interrupted by a year or more of teaching in schools.

The Edmonton Home Economics Association Prize of the value of $25.00 in books is awarded annually to the graduating student in the Faculty of Education, Edmonton, who obtains the highest average in any two of the following courses in Household Economics: Household Economics 450, 350 and 460, provided that the student's record is otherwise satisfactory to the Faculty Council.

PROVINCIAL ASSISTANCE FOR TEACHER EDUCATION

Third and Fourth years of a Bachelor of Education Program.

A maximum of fifty grants consisting of one-half tuition fees may be awarded in each of the third and fourth years of the Bachelor of Education program. Recipients of tuition grants shall undertake to render one year of teaching service in Alberta in public or separate schools, for each grant received. This service shall be rendered immediately following the completion of the fourth year, or of the third year if the student does not enrol for the fourth year immediately following the completion of the third year. In the event of failure to render such teaching service the grant shall become a debt payable to the Province of Alberta.

Application for these grants should be made to, Chairman, Students Assistance Board, Department of Education, Administration Building, Edmonton, by August 31.

Tuition Grants for Graduates of other Faculties or other Universities

Grants consisting of one-half tuition fees may be granted by the Government of Alberta to graduates of the University of Alberta or of other universities. These applications will be considered by a Selection Committee which may base its recommendations on factors relating to suitability for teaching as well as academic standing. Candidates must elect a program of teacher education in the faculty of Education at the University of Alberta, leading to certification to teach at the high school level, and must undertake to teach at the junior or senior high school level in the public or separate school system of Alberta for one year following the completion of a year of training in the Faculty of Education or to refund the grant.

Application forms are available at the office of the chairman, Students Assistance Board, Administration Building, Edmonton, or the Faculty of Education.

Applications which must be accompanied by official transcripts, should be sent to the Dean, Faculty of Education, University of Alberta, Edmonton by August 31.

THE ALBERTA TEACHERS' ASSOCIATION LOANS

The Alberta Teachers' Association has established a fund to provide loans to teachers who hold a permanent Alberta Certificate and who are in need of financial assistance to continue their preparation as teachers through intramural study. Applications will normally be considered during the months of May and September. Applications to be dealt with in May must be received by May 15. Applications to be dealt with in September must be received by August 31. Special applications may be considered during the University year.

If the loan fund is inadequate to meet all demands made upon it, priority will be given to applications in May. Inquiries and applications should be made to the Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton.

LOCAL SCHOOL BOARD ASSISTANCE

Some local School Boards provide grants or loans to students in teacher education programs. Students should inquire of their own principal or local School Board office.

THE FACULTY OF ENGINEERING

The Henry Birks and Sons, Limited, Gold Medal is offered annually to a graduating student from the Faculty of Engineering on a basis of academic standing in the final two years (not less than 75%) and qualities of leadership and character.

The Association of Professional Engineers of Alberta Gold Medals are offered to one graduating student in each of the departments of chemical, civil, electrical, engineering physics, mechanical, metallurgical and mining engineering on the basis of individual talent, application and diligent study. For the purposes of this award the academic record of the third and fourth years is combined and a general average of at least 75% must be attained. The right is reserved to withhold the awarding of one or all of these medals if, in the opinion of the Faculty of Engineering, candidates do not show sufficient merit.

The Society of Chemical Industry Merit Awards. Three awards will be made annually consisting of a gold key bearing the crest of the Society and a year's subscription to "Chemistry and Industry". The awards will be made to the student graduating with the highest standing in each of Honors Chemistry, Honors Biochemistry and Chemical Engineering, provided an average of 75% is attained in the final year and that the course has been completed in the normal number of years.

The Encyclopaedia Britannica Award in Engineering consisting of a 54-volume set of The Great Books of the Western World will be awarded annually to a student of outstanding merit graduating from the Faculty of Engineering at the University of Alberta, Edmonton. The award is to be made on the performance of the student in the non-technical assignments associated with the course in Eng.P. 459, "The Practice of the Engineering Profession", provided that the student has obtained an overall average of not less than 70% in the full final year of his program.

(The following awards are listed alphabetically)—

The Aluminum Company of Canada, Limited, Scholarship. See details under Faculty of Arts.

American Society for Testing Materials Prize Awards—Four prizes each consisting of a year's membership in the Society, a certificate, eight issues of the A.S.T.M. Bulletin and two books from a selected list on standards and materials, are offered annually to students in engineering on the basis of demonstrated ability and interest in the field of materials.

Prize winners are selected on the basis of their performance in courses in materials: Met.E. 252, Ch.E. 252, Met.E. 361 and C.E. 455; or on the basis of a summer report on a topic related to materials.

R. Angus (Alberta) Limited Scholarship in Highway Engineering of $500.00 to be awarded annually to a student of outstanding merit entering fourth year Civil Engineering in the Highway Engineering option. To qualify, the student must have taken a complete third year program in Civil Engineering at the University of Alberta and have attained an average of at least 75%.

Apply to Administrator of Student Awards by June 15.

The Association of Professional Engineers of Alberta Scholarship in Engineering of the value of tuition and fees is offered annually to a student of outstanding merit completing the first year and entering the second year of the Faculty of Engineering at the University of Alberta, Calgary.

The Board of Governors of the University Scholarship of the value of $100.00 is awarded annually to a student of outstanding merit entering the second year of Engineering, provided that an average of not less than 75% has been obtained on the work of the first year.

The British America Paint Company Scholarship in Engineering of $500 is awarded annually to a student of outstanding merit entering the second year of the Faculty of Engineering. The award will be based on the work of the first year.

The California Standard Company Scholarship in Engineering of $400 is offered annually to a student of outstanding merit who is entering the final year of chemical or Mechanical Engineering and who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

Apply to Administrator of Student Awards by June 15.

The California Standard Company Geophysical Scholarship, valued at $400.00 is offered annually to a student of outstanding merit who is entering the third year of honors Physics and Geology or Engineering Physics (Geophysics option), and who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

Apply to the Administrator of Student Awards by June 15.

The Canada Cement Company Scholarships—Two scholarships, each of the value of $500.00 are offered annually to students of outstanding merit, one entering third year Civil Engineering and one entering third year Mechanical Engineering, at the University of Alberta, to be based on the work of the second year. To qualify a student must have completed a second year program of normal weight at the University of Alberta and have attained an average of at least 75.%.

In the event that no student qualifies for one of the above, the award would be made available in the other department as a second award for that year.

The Canadian Construction Association Essay Prize of $50.00 and an Engineer's Handbook will be awarded annually for the best essay on a subject related to construction, by a student in the final year of the Faculty of Engineering. Essays may be those requisite to the student's program or written specially. Selection will be made by the Faculty and the winning essay will then be eligible for a prize of $100.00 on a Canada wide basis.

Essays to be submitted to the office of the Dean by April 15.

The Cave and Company Ltd. Scholarship in Chemistry—Refer to details under Awards in Departments.

The Chemical Institute of Canada Prize in Chemical Engineering of the value of $25.00 in books is awarded annually to the student in Chemical Engineering who obtains the highest standing in the work of the third year, provided that the student's general record is satisfactory to the Faculty Council.

The C.I.S.C. Scholarship in Structural Engineering of the value of $300 will be awarded annually by the Alberta Regional Committee of the Canadian Institute of Steel Construction to a student of outstanding merit entering fourth year Civil Engineering, preferably in the Structural Engineering option. To qualify, the student must have taken a complete third year program in Civil Engineering at the University of Alberta and have attained an average of a least 75%.

The George E. Cole Memorial Prize in Economic Geology of $25.00 is offered annually by Mrs. Janet C. Cole in memory of her late husband, a former President of the Canadian Institute of Mining and Metallurgy, to the student obtaining the highest standing in Geology 460, provided that the student obtains at least 75% in the subject and is registered in a full year's program.

The Con-Force Products Ltd. Scholarship in Civil Engineering of the value of $400 is offered to a student of outstanding merit entering the third year of Civil Engineering. The award will be based on the work of the second year at the University of Alberta.

The A. Cristall Memorial Scholarship of $100, provided by the Royal George Hotel, Edmonton, will be awarded annually to a student of outstanding merit in Drafting 151 in the Faculty of Engineering at Edmonton, provided the student passes all courses in a full program and with an average of at least 75%.

The Engineering Students Society (Calgary) Bursary of $100 is offered to a student completing the second year of the Faculty of Engineering at Calgary on a basis of academic standing and financial need. Applicants must be members of the E.S.S., Calgary.

Apply to Administrator of Student Awards by June 15.

Engineering Institute of Canada Prize for Third-Year Students in Engineering—The Engineering Institute of Canada offers a prize of $25.00, open for competition to university students in Engineering following all of the prescribed courses in chemical, civil, electrical, mining, or mechanical engineering.

To be eligible a student must be a member of, and active in, such a students' engineering organization of the University as the Engineering Students' Society, the Mining and Geological Society, the Chemistry Club, the Students' Branches of the Institute of Electrical and Electronic Engineers or the Engineering Institute of Canada.

The recommendations for award shall be made, after the final examinations of the year, by a committee to be appointed by the Dean of Engineering at a faculty meeting in the session.

The bases of award shall be: (a) the average mark for the courses assigned to that year, this in no case to be less than 75%, and (b) the value of services rendered to a students' engineering organization of the University.

The Gas Companies Undergraduate Scholarships in Engineering of $800 and $700 are offered annually by Northwestern Utilities Limited and Canadian Western Natural Gas Company Limited to two students on the basis of academic achievement in the second year of the Engineering program. These scholarships are tenable in the third year of the Engineering program at the University of Alberta.

The Sam J. Gorman Memorial Bursary in Engineering of the value of $300.00 is offered by his executors to a student who has completed the second year of any branch of Engineering at the University of Alberta. The award will be based upon high scholastic standing in the work of the year just completed and upon evidence of financial need.

Apply to the Administrator of Student Awards by June 15.

The Inland Cement Company Scholarship of the value of $600 is offered annually to a student of outstanding merit entering the fourth year of Civil Engineering. The award is based on the work of the third year. To qualify, a student must have completed a third year program of normal weight at the University of Alberta and have attained an average of at least 75%.

The Johnston Testers Limited Scholarship of the value of $500 is offered to a student of outstanding merit entering the third year of Chemical or Mechanical Engineering who intends to elect the undergraduate courses in Reservoir Mechanics as part of his fourth year program. The award will be based on the work in the second year of Engineering at the University of Alberta.

Apply to Administrator of Student Awards by June 15.

The Douglas Farquhar Johnston Bursaries in Engineering of the value of $500.00 each are offered annually to two students entering the fourth year of a program in Mining Engineering or Metallurgical Engineering. The awards will be based on academic standing and financial need.

Apply to the Administrator of Student Awards by June 15.

The John Alexander McDougall Memorial Scholarship in Civil Engineering of $500 is offered annually to a student of outstanding merit entering the fourth year of Civil Engineering based on the work of the third year.

The Northern Alberta Branch of the Canadian Institute of Mining and Metallurgy offers four prizes of $15.00, one prize for the best student paper submitted during the term on each of the following subjects: (a) Mining, (b) Metallurgy, (c) Geology, and (d) Petroleum. To be eligible a student must be a member of the Mining and Geological Society of the University of Alberta. Recommendations for awards are to be made by each department concerned. The prize may be withheld if the papers submitted are not considered to be of sufficient merit to justify the awards.

The Northern Electric Undergraduate Scholarship which provides an amount not exceeding $500 to cover tuition and general fees and the cost of books for one year, is awarded annually to a student of outstanding merit who is proceeding into the second, third or fourth year of Electrical Engineering, Engineering Physics or Honors Physics. The applicant must be a Canadian citizen or a landed immigrant and must normally have secured an average of at least 75% in the work of the preceding university year. Students who have held the scholarship previously are free to apply for renewal of the award.

Apply to the Administrator of Student Awards by June 15.

The Jessie E. Paull Memorial Prize of the value of $50.00 is awarded annually to the student obtaining the highest standing in C.E. 410 (Highway Engineering)

in the fourth year of civil engineering, provided the student obtains an average of a least 75% in this subject and is registered in a full year's program.

The R. C. E. Memorial Scholarship—The Royal Canadian Engineer Memorial Trust offers annually a scholarship of $125.00 to a student who has completed his third year in Engineering. Applicants must be members in good standing of the Officers' Training Corps (Army) and have had at least one summer's training with such unit. Award will be made on the basis of academic standing and qualities of leadership manifested in the activities of the Officers' Training Corps and in student affairs generallly.

Apply through the Administrator of Student Awards by May 15.

The Royal Canadian Legion Scholarship in Physics or Electrical Engineering of $400 is offered annually in the field of Physics or Electrical Engineering.

The terms of award are otherwise the same as for the Royal Canadian Legion Scholarship—see Matriculation Awards.

Apply to the Administrator of Student Awards by June 15.

The Schlumberger of Canada Scholarship of $500 is offered to a student of outstanding academic merit entering the fourth year of Electrical Engineering at the University of Alberta based on the work of the third year. A grant-in-aid of $500 is also provided to the University. This scholarship is offered for the academic years of 1965-66 and 1966-67.

The J. M. Sharpe Memorial Prize of $100, provided in his memory by Electrical Equipment (Alberta) Ltd., will be awarded to the student obtaining the highest standing in the Electrical Engineering subjects, E.E. 330, E.E. 350 and E.E. 370 in the third year of the Electrical Engineering program provided that the student obtains an overall average of at least 75% in these subjects and that he is registered in a program of normal weight.

The Sherritt Gordon Mines Limited Scholarship in Chemical Engineering of $600 will be awarded annually to a student of outstanding merit entering fourth year Chemical Engineering.

The Socony Mobil Oil of Canada Ltd. Scholarship in Engineering of $400 is offered to a student who is entering the final year of Chemical or Mechanical Engineering and who will be enrolled in the Petroleum Engineering options, on a basis of academic standing and of good character and initiative. In addition the donor provides a grant of $400 to the Department in which the student is registered.

Apply to Adminstrator of Student Awards by June 15.

The Sunwapta Broadcasting Company Scholarship of $200.00 for students entering fourth year Engineering Physics or Electrical Engineering interested in the field of communications, as related to the Broadcasting and Television industry.

Apply to Administrator of Student Awards before June 15. (See further details under Faculty of Arts and Science.)

Underwood McLellan and Associates Limited Scholarship in Municipal Engineering of $200 is awarded annually to a student of outstanding merit

entering fourth year Civil Engineering, preferably in the Municipal Engineering option. To qualify, the student must have taken a complete third year program in Civil Engineering at the University of Alberta and have attained an average of at least 70%.

Apply to the Administrator of Student Awards by June 15.

The H. R. Webb Memorial Scholarship of the value of tuition and fees is offered annually by the Association of Professional Engineers of Alberta in memory of Professor Harry Randall Webb, formerly Registrar of the Association, to a student of outstanding merit completing the first and entering the second year of the Faculty of Engineering in Edmonton.

Webb Memorial Student Paper Competition—Each year the Engineering Students' Society at Edmonton awards three prizes of $50.00, $30.00 and $20.00 for the three best student papers written and presented to the Society at its regular meetings. To be eligible, a student must be a member of the Engineering Students' Society in Edmonton. The rules of the competition are set forth in the Society's constitution.

The John Wilcox Memorial Prize of the value of $50.00 provided by the Petroleum Engineering Class of '53, will be awarded annually to a student of outstanding merit, completing 2nd or 3rd year of Chemical Engineering. General ability and financial need will be considered as well as academic standing.

The Hotel York Scholarship of $250 is offered annually to a student of outstanding merit in Drafting 151 in first year Engineering at Calgary. To be considered, the student must have passed all courses of the full first year, and have a general average of not less than 75%.

THE SCHOOL OF HOUSEHOLD ECONOMICS

The Warren W. and Ida E. Prevey Memorial Gold Medal in Household Economics is offered by Dr. Esther and Miss Ruth Prevey in memory of their parents to the graduating student making the highest standing in the work of the last two years of the course leading to the degree of B.Sc. in Household Economics, provided such student's standing is deemed satisfactory to the School of Household Economics.

The Russell Food Equipment Limited Scholarship of $350.00 is offered annually to a suitably qualified student graduating from the School of Household Economics of the University of Alberta who is proceeding, either at this or any other approved university, in an M.Sc. program in Foods, Nutrition, or Institution Management, or proceeding into a Dietetic Interneship at an approved institution. The scholarship will be payable after registration in the selected program.

The Lorena Barfoot Prize of $50.00 is offered annually to a suitably qualified student graduating from the School of Household Economics of the University of Alberta and who is proceeding into a Dietetic Interneship at an approved institution. The prize will be payable when the student has begun the Interneship.

The Mabel Patrick Scholarship of $200.00, provided by the Alberta Home Economics Association, is offered annually to a student of outstanding merit based on the work of the first and second years in Household Economics, provided that the student obtains an average of a least 75% and passes in all courses.

The Florence Hallock Memorial Prize of the value of $75.00 is awarded annually by the Edmonton Home Economics Association to the student in Household Economics in Edmonton who takes the highest standing in the work as outlined for the first year, provided that the student passes all courses and obtains an average of not less than 75% on the work of the year.

The Annie Gertrude Tory Scholarship of the value of $75.00 endowed to her memory by her husband, the late Henry Marshall Tory, first President of the University, is offered annually to the student in Household Economics who takes the highest standing in the work of the second year. The student must pass all courses and obtain an average of not less than 75% on the work of the year.

The Gretta Shaw Simpson Memorial Prize of the value of $25.00 is offered annually by Miss Maimie S. Simpson in memory of her sister, formerly instructor in Bacteriology in this University. It is to be awarded to the student in Household Economics who takes the second highest standing in the work of the second year, provided that the student passes all courses and obtains an average of not less than 75%.

The Edmonton Home Economics Association Prize—See under Faculty of Education.

The Maria Isabel O'Connor Prize to the value of $15.00 is offered annually in honor of the mother of the late Honorable G. B. O'Connor, Chief Justice of Alberta, to the student in second year Household Economics, who takes the highest standing in Household Economics 304, provided that the student has carried the full work of the second year and has a record satisfactory to the School of Household Economics.

The Phylis Osborne McGachie Bursary in Household Economics of the value of $100.00 is available to a student in the second year of the B.Sc course in Household Economics. The award will be made on the basis of academic record, which must not fall below second class, and of financial need. Applications should reach the Administrator of Student Awards by June 15.

The Alberta Wheat Pool Scholarships—See under Matriculation Scholarships.

THE FACULTY OF LAW

The Horace Harvey Gold Medal, established by the late Chief Justice of Alberta, is offered for the highest standing in the work prescribed for the LL.B. degree, provided that the student obtains an average of not less than 75%.

The George Bligh O'Connor Silver Medal in Law is offered in memory of the late Honorable G. B. O'Connor, Chief Justice of Alberta, for the second highest standing in the work prescribed for the LL.B. degree, provided that the student obtains an average of not less than 75%.

The Gilbert M. Blackstock Scholarship of $250 in memory of the late Mr. Blackstock will be awarded for outstanding merit in the work prescribed for the first year of law. Need as well as academic standing may be taken into consideration. (The award will be offered for four years beginning 1964-65.)

The Ernest Brown Wilson Memorial Prize in Law of $100.00 will be awarded annually to a student in the graduating class in Law. The award will be based on outstanding merit in the work prescribed for the third year of the LL.B. degree.

The Board of Governors of the University Scholarship of the value of $100.00 is awarded on the basis of the work of the first year in the Faculty of Law, provided that an average of not less than 75% be obtained in the work of the year.

The President's Scholarship—See under the Faculty of Arts.

The Honorable Clinton J. Ford Shields will be presented annually by The Honorable Clinton J. Ford, formerly Chief Justice of Alberta, to each of the two third-year students who make the best argument in the finals of the annual Moot Court Competition. In addition, he has presented to the University, a permanent plaque on which the names of each year's winners are to be recorded.

The four finalists are selected from those students who have presented the best arguments in the second-year Moot program. The four will compete in two teams, the winning team to receive the shields.

The Edmonton Lodge of B'nai B'rith Prize of $50.00 is offered to such student in the second year of Law as may be selected by the Faculty of Law.

The Raymond James Memorial Prize of $25.00 is offered annually by Mrs. E. L. FitzSimon, LL.B. 1926, in memory of her brother, to be awarded to a student in the final year in Law for outstanding merit in the subject of Equity.

The Aluminum Company of Canada, Limited, Scholarship. See details under Faculty of Arts.

The Insurance Company of North America Prize of $250 will be awarded annually to the student in the Faculty of Law at the University of Alberta who obtains the highest standing in Insurance Law.

The National Trust Prize—A prize of books of the value of $30.00 is offered by the National Trust Company to a student of the graduating class in Law for outstanding merit in the examinations in Equity 1, Equity 2, Real Property 2, Real Property 3, and Wills and Administration, provided an average of at least 75% is attained on complete second and third years.

The Sydney B. Woods Memorial Prize in Constitutional Law—A prize of value of $50.00 has been provided by S. W. Field, Q.C. and L. D. Hyndman, Q.C., former partners of the late Sydney B. Woods, K.C. The prize is awarded annually to a student in Law for outstanding merit in the subjects of Constitutional Law. The award is conditional upon the student's reaching a standard which is deemed satisfactory to the Faculty Council.

The Morris and Naomi Shocter Memorial Prize in Law of $50.00 is awarded to a student at the end of the third year of Law, who has maintained a satisfactory academic record and who has made a significant contribution to student life in the University.

The William Gordon Egbert Prize in Administrative Law of the value of $50.00 is awarded annually for outstanding merit in Administrative Law.

The Canada Permanent Trust Company Prize in Wills, of the value of $100.00, is offered annually to a student in the Faculty of Law for outstanding merit in the subject of Wills, provided the students' general record is satisfactory to The Faculty Council.

The Canada Law Book Company Prize in Law is awarded for outstanding merit in the work prescribed for first year of Law. The Prize consists of books to the value of $75.00 to be selected from a list submitted by the Canada Law Book Company and the selection shall be made within six months of the awarding of the prize.

The Carswell Prizes in Law. Three prizes of the value of $30.00 in books each are offered by the Carswell Company, Limited, Law Publishers, to three students for outstanding merit in the work of the first, second and third years respectively.

The books shall be selected by the student from a list submitted by the Carswell Company, and the selection shall be made within six months of the awarding of the prize.

THE FACULTY OF MEDICINE

General

The Moshier Memorial Gold Medal is offered by the Volunteer Overseas Medical Officers' Association of Edmonton in memory of the late Lieutenant-Colonel H. H. Moshier, M.B., to a graduating student for outstanding merit in all studies in the Faculty of Medicine, provided that the over-all average mark of the student is 75% or more.

The John W. Scott Honor Award, consisting of a medal and a cash prize of $250.00, is offered by the Medical Alumni Association of the University of Alberta to a student completing the final year of the M.D. program who, over the four years of the course, has shown himself to possess to an outstanding degree those qualities of scholarship, leadership and character which may be expected to lead to a distinguished position in the medical profession. The recipient will be selected by a committee on which faculty, students and alumni will be represented.

The award may be made to more than one student in any one year, and may be withheld in the event that no sufficiently deserving candidate is available.

Research Fellowship of College of Physicians and Surgeons of Alberta—The Council of the College of Physicians and Surgeons of Alberta has established a research fellowship for undergraduates in the Faculty of Medicine under the following conditions:

1. The amount of the fellowship shall be $1,800, plus general and instruction fees for the next succeeding year in medicine, provided the holder returns to this Faculty.

2. It shall be granted at the completion of the first or second year in Medicine.
3. This fellowship shall be tenable for one year, but may be renewed for a further period.
4. The research shall be carried out in one of the basic sciences.
5. It shall only be granted when in the opinion of the Medical Faculty they have a student who from the standpoint of ability and aptitude is worthy of this scholarship.
6. From time to time the Council shall be advised of the nature of the work being carried out and its progress.

Apply to the Administrator of Student Awards before April 15.

The Scholarships of the College of Physicians and Surgeons of the Province of Alberta. Six awards of $200.00 each will be awarded as follows:

1. One scholarship shall be awarded to that student of each of the first three years of Medicine who attains the highest average mark in his class.
2. One scholarship shall be awarded to that student of each of the first three years of Medicine who attains the second highest average mark in his class.

Each of these awards is contingent upon the student's proceeding with his University course during the year following the award.

The Dr. Allan Coates Rankin Award, of the value of $100.00, will be awarded annually to the most deserving and outstanding student completing any year of the Faculty of Medicine. The selection will be made by the Faculty on a basis of academic standing in that year and of financial need.

The Alberta Tuberculosis Association Prize of $100.00 is offered annually to a third or fourth year medical student for the most satisfactory essay, submitted in duplicate, on some phase of thoracic disease. The prize also includes a one-year subscription to the American Review of Respiratory Diseases.

Essays to be submitted to the Administrator of Student Awards by March 1.

The Kenneth William Moodie Scholarship—As a memorial to her nephew, Flying Officer Kenneth William Moodie, a graduate in science of the University of Alberta who lost his life in May, 1942 while on operations, the late Miss Marion E. Moodie made provision in her will for an annual scholarship of $200.00 to a student of outstanding merit entering the first year of the Faculty of Medicine or the third year of the B.Sc. program in the Faculty of Science in Edmonton. The basis of award will be academic attainment on the previous year's standing at the University of Alberta, financial need and evidence of satisfactory personal qualities.

Apply to the Administrator of Student Awards by June 15.

The Vessie Heckbert Memorial—$2,500 will be offered annually to either an undergraduate or a graduate in the Faculty of Medicine at the University of Alberta for one year of research in the field of cancer treatment. In the event that no suitable person is available in any one year, the award may be made to

two senior medical students as research workers during the summer. in the amounts of $1,000 each plus $250 each for research materials.

Apply to the Dean of Medicine by March 1.

Bacteriology

The Allan Coates Rankin Prize in Bacteriology of $25 is given by the Rankin Medical Journal Reporting Club to the medical student who obtains the highest mark in Bacteriology 421, provided that he has obtained at least a 75% mark in this course and that he has taken, and has passed, all of the subjects of that year.

Biochemistry

The Hugh and Mabel McAfee Memorial Scholarship of $250.00 is offered annually to a student of outstanding merit in Biochemistry in the first year of the Faculty of Medicine, provided the student's record is otherwise satisfactory.

Medicine

The E. L. Pope Memorial Award in Medicine consisting of $75 and a scroll is offered annually by the Edmonton Academy of Medicine to a graduating student for outstanding merit in Medicine, providing that the overall average mark in the courses in Medicine is 75% or more.

The Prizes of the Associated Hospitals of Alberta in Medicine and Surgery of the value of $50 each are offered by the Associated Hospitals of Alberta to two third year students of outstanding merit in the work of Medicine and Surgery respectively in second and third years.

Obstetrics and Gynaecology

The Conn Memorial Gold Medal is offered annually through the generosity of Mr. G. H. Wood to a graduating student for outstanding merit in Obstetrics and Gynaecology, providing that the over-all average mark of the student in the courses in these subjects is 75% or more.

Ophthalmology

The Dr. Ernest A. Johnson Scholarship in Ophthalmology of $100 will be awarded annually to a student of outstanding merit graduating from the Faculty of Medicine, based on the results of the examinations in Ophthalmology in the third or fourth years.

Pathology

The John James Ower Memorial Gold Medal in Pathology, provided by the Medical Alumni together with friends and colleagues of Dr. Ower, will be awarded annually to a graduating student in the Faculty of Medicine for outstanding merit in Pathology, provided that an average of 75% has been attained in the courses in Pathology.

The John James Ower Memorial Scholarship in Pathology of $250, endowed by the Medical Alumni together with friends and colleagues of Dr. Ower, will be awarded annually to a student completing the 3rd year of the Faculty of Medicine for outstanding merit in Pathology. A student must have attained at least 75% in the course in Pathology in each of the 2nd and 3rd years to be eligible.

Pharmacology

The Nathan Browne Eddy Prize in Pharmacology is offered by Hoffmann-La Roche Limited to a student who has successfully completed the second year of Medicine with an average standing of at least 75% and has shown outstanding merit in the course in Pharmacology. The prize is an instrument useful in Medical practice or books to the value of about $40.00.

Physiology

The A. W. Downs Prize in Physiology endowed jointly by Dr. W. J. Downs and the Medical Alumni Association, will be awarded annually to the medical student who obtains the highest mark in the course in physiology in the first year provided he has obtained at least a 75% mark and has pass in all subjects. The prize is an instrument useful in medical practice of a value of about $50.00.

Psychiatry

The Dr. S. S. Spaner Prize in Psychiatry, of the value of $50.00, will be awarded annually to a student of outstanding merit in Psychiatry who is completing the final year, provided the student's record is otherwise satisfactory.

Surgery

The Mewburn Memorial Gold Medal in Surgery is offered annually by the Medical Undergraduate Society of the University of Alberta to a graduating student for outstanding merit in surgery, providing that the over-all average mark of the student in courses in Surgery is 75% or more.

The Prizes of the Associated Hospitals of Alberta in Medicine and Surgery —see under Medicine above.

The Surgical Research Prize of $50.00 will be awarded to a third or fourth year student in the Faculty of Medicine for the best manuscripts submitted on an original Surgical Research topic. Suggested general divisions for the topics are Pure Experimental Surgical Research or Clinical Surgical Research. Although importance will be attached to an original approach to an unsolved problem, other topics will be considered. Manuscripts are to be neatly typewritten, double spaced and are not to exceed twenty-five full pages. Figures, charts and an adequate bibliography will be expected. For details regarding the manuscript applicants may contact the members of the Department of Surgery. Manuscripts must be submitted to the Dean of Medicine by March 31 of each year.

Medical Laboratory Science

The Associated Hospitals of Alberta Gold Medal and a prize of $25.00 will be given to the student graduating with the highest distinction from the B.Sc. program in Medical Laboratory Science.

The Associated Hospitals of Alberta Prize in M.L.S. of $50.00 is offered annually to a student of outstanding merit completing the second year of the Medical Laboratory Science program.

The Alberta Society of Pathologists Prize in M.L.S. of $25.00 is offered annually to a student of outstanding merit completing the first year of the Medical Laboratory Science program.

THE SCHOOL OF NURSING

The President's Gold Medal in Nursing and the Prize of the Chairman of the University Hospital Board are awarded to a graduating student for outstanding merit in the theory and practice of nursing.

The Board of Governors of the University awards book prizes as follows:

(a) For outstanding merit in nursing during the senior year.

(b) For outstanding merit in the theory of nursing during the senior year.

(c) For outstanding merit in the practice of nursing during the senior year.

The Margaret Cogswell Memorial Scholarship of $250 is awarded annually to a member of the Alberta Association of Registered Nurses, a resident of the province and a graduate of a school of nursing in Alberta, who is proceeding to further full time study in Nursing Education at the University of Alberta. The award will be based on previous academic record and professional competence.

The Edmonton Home Economics Association Prize of $25.00 is awarded to a graduating student in Edmonton for outstanding merit in the theory and practice of nutrition.

The Medical Staff of the University Hospital awards prizes in the graduating year as follows:

(a) Strathcona Prize in Medicine

(b) Strathcona Prize in Obstetrics and Gynaecology

(c) Strathcona Prize in Psychiatry

(d) Strathcona Prize in Surgery

The Operating Room Nursing Prize is awarded to a graduating student for outstanding merit in operating-room technique.

The Helen Smith Peters Memorial Prize is awarded to a graduating student for outstanding merit in the theory and practice of paediatric nursing.

The Dr. A. C. McGugan Prize is awarded to the graduating student who, in the opinion of the student body, has contributed most to the welfare of her fellow students.

The Prize for Bedside Nursing is awarded by the Nursing Staff to the graduating student who has the best record for kindness and proficiency in bedside nursing.

The University of Alberta Hospital School of Nursing Alumnae Association Prize is awarded to a student for outstanding merit in the theory and practice of nursing in the intermediate year.

The Meta M. Hodge Memorial Prize is awarded to a student for outstanding merit in the practice of nursing in the intermediate year.

The Canadian Nurse Magazine Prize of a one-year subscription to the Canadian Nurse is awarded by the Editorial Board of the Canadian Nurse to a student for outstanding merit in the theory and practice of nursing in the junior year.

The Women's Auxiliary of the University Hospital Prize is awarded to a student for outstanding merit in the theory and practice of nursing in the preclinical term.

THE FACULTY OF PHARMACY

The Alberta Pharmaceutical Association Medals. A gold medal plus full cost of registration in the Association is offered for outstanding merit in all subjects of the fourth year of the Faculty of Pharmacy provided that at least 60% is attained in each subject and an average of at least 75%.

A silver medal plus one half the cost of registration in the Association is offered on similar terms to a student completing the three-year degree program.

The Film Services (Alberta) Limited Scholarship of $500 is offered annually to a student of outstanding merit entering fourth year Pharmacy preferably in the Pharmacy Administration program.

The Alberta Pharmaceutical Association Awards are offered as follows:

1. A scholarship of $100.00 for outstanding merit in all subjects of the first year, provided that the mark obtained in any subject does not fall below 60%.
2. A scholarship of $100.00 for outstanding merit in all subjects of the second year, provided that the mark obtained in any subject does not fall below 60%.
3. A book prize consisting of a five-year subscription to The Practical Pharmacy Edition of the Journal of the American Pharmaceutical Association for outstanding merit in the dispensing course in the second year.
4. A prize consisting of registration with the Alberta Pharmaceutical Association, for the student preparing the best thesis in the Pharmacy 433 laboratory course provided the record of the student is otherwise acceptable.

The M. J. Warner Scholarship of the value of $100.00 is offered annually by the Alberta Pharmaceutical Association in memory of the late M. J. Warner for outstanding merit in the pharmacy course of the first and second years, provided that the mark in any pharmacy subjects does not fall below 65%, that the average obtained in all subjects is not less than 75% and that the student's record is otherwise satisfactory to the Faculty of Pharmacy.

The Shipley Scholarship of the value of $250.00 is offered by Shipley Photo Service Limited to a student of outstanding merit completing the second year course in dispensing pharmacy.

The Drug Travellers of Alberta Bursary of the value of $300.00 is offered jointly by the Alberta Range Riders, Calgary, and the Northern Ambassadors, Edmonton (Alberta drug travelling fraternities), to a student of outstanding merit who has completed at least one academic year in the Faculty of Pharmacy. The basis of this award is scholarship, leadership, financial need and aptitude in the field of Pharmacy.

The Southern Alberta Pharmacy Bursary of $250.00 is offered annually by the South of Calgary Pharmacists and the Highwaymen (Southern Alberta Drug

Travellers) to a student of outstanding ability completing the first year of the Faculty of Pharmacy. The student must have taken the majority of his high school training in Alberta, south of but not including Calgary. Financial need will be considered in making the award.

The Edmonton and District Ladies' Pharmaceutical Auxiliary Scholarship of $100 is offered annually to a student of outstanding merit entering the fourth year of the Faculty of Pharmacy.

The Calgary Ladies Pharmaceutical Auxiliary Prize is offered annually to a woman student of outstanding merit in the pharmacy courses of the first year, provided that her combined average in these courses is not less than 75%, and that her record in the other courses is satisfactory to the Faculty of Pharmacy. If no qualified woman student is available the award may be made to a man. The amount of the award will be determined each year but it is expected to be not less than $50.00.

The Canadian Foundation for the Advancement of Pharmacy Scholarships, valued at $100.00 are offered to undergraduates. The number of such scholarships will be determined from year to year. One award will be available to a student completing the first year of the course, and one to a student completing the second year.

The minimum requirements are a general average of 75% for the previous term's work, provided the standing in the practical work in Pharmacy does not fall below 75%. Financial need will be considered in making the award.

The Charles E. Frosst Scholarship of the value of $250.00 is offered annually by Charles E. Frosst and Company of Montreal to a student of outstanding merit entering the final year of the Faculty of Pharmacy.

The Charles Cummer Memorial Prize of the value of $100.00 is offered to a student of outstanding merit entering the second or third year of the pharmacy course. Financial need will be considered in making the award.

The W. W. Maday Scholarship of the value of $100 is offered annually for three years (1964-65, 65-66, 66-67) by Walter W. Maday to a student of outstanding merit entering the fourth year of the Faculty of Pharmacy in the Hospital Pharmacy program.

The Burroughs Wellcome Bursary of the value of $250.00 is offered by Burroughs Wellcome and Company (Canada) Limited to a student entering the second or third year of the pharmacy course who has demonstrated outstanding ability in the field of pharmacy. Financial need will be considered in making the award.

The Merck, Sharp and Dohme Awards. Two awards each consisting of $25 cash and certain pharmaceutical manuals are offered by Merck, Sharp and Dohme of Canada Limited to the two students in first year Pharmacy who attain the highest standing in Chemistry 230 and Chemistry 250 respectively.

The Canadian Pharmaceutical Association Prize consisting of a copy of the Canadian Formulary and The Compendium of Pharmaceutical Specialities (Canada) is offered to a student of outstanding merit in the Pharmacy 432 course.

THE FACULTY OF PHYSICAL EDUCATION

The Alumni Gold Medal in Physical Education is offered by the Alumni Association of the University of Alberta to the outstanding graduating student in Physical Education, provided the student has been registered in a full year's program and has obtained an average of at least 75% in the final year.

The J. K. Campbell and Associates Limited Scholarships of $150.00 and $200.00 will be awarded annually to two students of outstanding academic merit completing the first and second years respectively in the Faculty of Physical Education.

The Edmonton Women's Branch of the Canadian Association for Health, Physical Education and Recreation Book Prize of $50.00 in books is offered to a woman student of outstanding merit completing the first year of the Bachelor of Physical Education program in Edmonton.

The Edmonton Branch of the Canadian Association for Health, Physical Education, and Recreation Bursaries of $100 each are offered annually, one to a student entering the second year and one to a student entering the third year of the Faculty of Physical Education in Edmonton. These awards will be made on the basis of academic record which must not fall below second class, and of financial need. Consideration will also be paid to the student's contribution in the field of Physical Education or Recreation.

Recreation Scholarships—see under Province of Alberta Assistance.

THE SCHOOL OF REHABILITATION MEDICINE

The Arthur Stanley Memorial Prize of $50.00 is offered by the Saskatchewan Physical Therapists Association to the student graduating in Physical Therapy with the highest general proficiency standing in all years.

The Physiotherapy Book Prize is offered by the Canadian Physiotherapy Association to the student obtaining the highest standing in the final year of the diploma course in Physical Therapy at the University of Alberta, providing that his or her record is otherwise satisfactory to the Council of the School.

The Occupational Therapy Book Prize will be offered annually by the Alberta Society of Occupational Therapists to the student obtaining the highest standing in the final year of the Diploma program in Occupational Therapy, providing that his or her record is otherwise satisfactory to the Council of the School.

The Calgary Branch Canadian Physiotherapy Association Book Prize will be awarded to an outstanding student graduating with the Diploma in Physical Therapy, on a basis of academic standing, practical work and general personality.

The Canadian Arthritis and Rheumatism Society (B.C. Division) Prize of $50.00 will be awarded annually to a student of outstanding merit completing the second year of the School of Rehabilitation Medicine at the University of Alberta.

The Canadian Foundation for Poliomyelitis and Rehabilitation (Alberta Chapter) Bursaries of $350.00 are offered to students in the Diploma program in Rehabilitation Medicine. The Foundation is sponsored by the Royal Canadian Legion. Three bursaries will be awarded each year, preferably one at each of the levels of entering first, second and third years. The basis of award will be academic standing and finanacial need. It is expected that recipients will carry on their profession in Alberta for a reasonable period after graduation.

Apply to the Administrator of Student Awards by August 1.

GRADUATE STUDIES AWARDS

THE FACULTY OF GRADUATE STUDIES

The following Scholarships and Fellowships are awarded primarily on a basis of academic standing. In general, awards are made only to applicants whose previous academic standing is either First Class or high Second Class.

Unless otherwise stated, awards are for one year only, but application for renewal will be considered. No award will be made to other than a full-time student.

Unless the terms specify tenure on a 12-month basis, awards will normally be paid over the 8 month academic term September 1 to April 30.

In order that awards may be equitably distributed, no student may hold more than one major award in a given year. A major award is defined generally as $1,000.00 for 8 months or $2,000.00 for 12 months for a student in first year graduate work and $1,400.00 for 8 months or $2,400.00 for 12 months in subsequent years.

Holders of major awards may not accept a teaching or other assignment involving more than the equivalent of four hours per week during the academic session or a total of 100 hours during a 12 month period. Holders of awards must pay regular tuition fees.

The following awards are open in two or more Fields of Study:
For awards in a single field, see later.

University of Alberta Graduate Fellowship—This is the senior fellowship within the Faculty and is valued at $3,600 on a twelve-month basis. It is open to a student who has completed at least one year of graduate study and registers for a full-time program leading to either a Ph.D. and Ed.D. degree. An award winner is expected to carry out a full-time research program during the summer months. Tenure may begin May 1 or September 1.

Apply to Administrator of Student Awards by March 1.

The Harold Hayward Parlee Memorial Fellowship. This fellowship, offered by The Winspear Foundation in memory of H. H. Parlee, Chairman of the Board of Governors of the University of Alberta from 1940 to 1950, is valued at $3,600 on a twelve-month basis, and is open to students who have completed at least one year of graduate study and register for a full-time program leading to either a Ph.D. or Ed.D. degree. An award winner is expected to carry out a full-time research program during the summer months. Tenure may begin May 1 or September 1.

Apply to Administrator of Student Awards by March 1.

Province of Alberta Graduate Fellowships. Three Fellowships valued at $3,600 each, on a twelve-month basis, are open to students who have completed at least one year of graduate study and register for a full-time program leading to either a Ph.D. or Ed.D. degree. Award winners are expected to carry out a full-time research program during the summer months. Tenure may begin May 1 or September 1.

Apply to Administrator of Student Awards by March 1.

Province of Alberta Graduate Scholarships. Ten scholarships valued at $2,600 or $2,200 each on a twelve-month basis, are open to students in any year of graduate study. Normally awards of $2,600 will be made only to students who have completed at least one year of graduate work. The usual award for students during the first year of graduate study will be $2,200.

These scholarships are intended to encourage winners to do full-time research during the summer months but the twelve-month term of award is not obligatory. Tenure may begin May 1 or September 1, and may be teminated by either the student or the University at any time after the end of the academic year. In case the scholarship is held for less than twelve months, the amount will be reduced proportionately.

Apply to Administrator of Student Awards by March 1.

Province of Alberta Tuition Bursaries. Twenty-five bursaries, covering the total fee assessment for the year of the award, are open to students who carry a full program of studies for any year of graduate study. Financial need will be considered in awarding these bursaries. They may be held in conjunction with other scholarships and graduate assistantships. These bursaries will not be awarded to students whose assessment is less than the full maximum annual fee.

Apply to the Administrator of Student Awards by August 10.

Graduate Teaching Assistantships are available in the Departments of most Faculties. Normal values for an eight month period range from $1,800 to $3,000 plus tuition fees. Limited travel grants will be paid to appointees coming 1,000 miles or more. Additional intersession assistance is available in some Departments.

Apply to Head of Department concerned by March 1.

Graduate Research Assistantships are available in many of the Science Departments, particularly in the applied fields. These usually permit full-time graduate study programs. Normal values are $1,940 for 12 months for the first year of graduate work and $2,360 for subsequent years. Some are at higher values for 8 months but will require up to 12 hours work per week for the Department concerned. Holders must pay regular Graduate Studies tuition fees.

Apply to Head of Department concerned by March 1.

The W. J. Gage Limited Research Fellowship of the value of $3,000 on a twelve-month basis is offered to a suitably qualified student in a Ph.D. program in Psychology or Educational Psychology at Edmonton for research in concept formation in and through language, preferably in children.

Apply to the Administrator of Student Awards by March 1.

The Francis F. Reeve Foundation Graduate Bursaries—The Francis F. Reeve Foundation offers three Graduate Bursaries valued at $2,400 each on a twelve-month basis. The awards are open to graduates of any university who are engaged in, or admissible to, a program leading to a graduate degree at the University of Alberta in any field of study for which facilities are available, and

will be made on the basis of scholastic attainment and financial need. Tenure may begin May 1 or September 1.

Apply to the Administrator of Student Awards by March 1.

The Francis F. Reeve Foundation Intersession Bursaries. Five bursaries of $1,000 each are open to any students already engaged in a program leading to a graduate degree at the University of Alberta who are prepared to spend not less than four months of the Intersession on full-time graduate program. Holders of twelve-month awards are not eligible. Awards will be made on the basis of scholastic attainment and finanacial need. Tenure must begin May 1. While any student may apply, preference will be given to those in the humanities, social sciences and education.

Apply to the Administrator of Student Awards by March 1.

The Friends of the University Intersession Scholarship of $1,000 is open to any student already engaged in a program leading to a graduate degree at the University of Alberta who is prepared to spend not less than four months of the Intersession on full-time graduate program. Holders of twelve-month awards are not eligible. Tenure must begin May 1. While any student may apply, preference will be given to those in the humanities, social sciences and education.

Apply to the Administrator of Student Awards by March 1.

The C.I.L. Fellowship—A fellowship of $2,000.00 per year plus $400.00 supplementary grant to the University is offered by Canadian Industries Limited for study and research leading to a doctorate degree in Chemistry or Chemical Engineering. The fellowship will be open to university graduates who are Canadian citizens or to university graduates who are intending to follow a career in Canada, with preference to Canadian citizens. Upon completion of the year's work, the fellow shall submit to Canadian Industries Limited a written report outlining work performed under the fellowship or alternatively a copy of the thesis prepared for his degree. Each award shall be in respect of one year, but, in the event that a fellow shows by his progress and application that such a course is desirable, the fellowship may be awarded to the same person for a further term of one year.

Apply to Administrator of Student Awards by March 1.

The Shell Canada Fellowship—An annual fellowship consisting of $2,250.00 to the student selected and a grant of $500 to the University, has been provided by Shell Canada Limited to sponsor research studies in Chemistry, Chemical Engineering, Mechanical Engineering, Petroleum Engineering, Geology, Physics, Geophysics or Oceanography leading to a postgraduate degree at the University of Alberta. The sum of $1,500.00 will be paid towards the fellow's living expenses and fees for the normal academic year. In cases where the fellow may be occupied in his postgraduate work for a full calendar year, a further $750.00 may be made available for the remaining four months. The fellowship is open annually to: (1) any science or engineering graduate of an approved Canadian university; or (2) any science or engineering graduate of an approved university outside of Canada who has had at least one year postgraduate study at a Canadian university. The applicant must make clear his intention to follow

a career in Canada. In cases where the fellow is engaged in post-graduate studies leading to a Ph.D. degree, the fellowship may be awarded for a second year to the same person.

Apply to Administrator of Student Awards by March 1.

The Pan American Petroleum Corporation Fellowship of $1,800 over 12 months plus tuition fees is offered to a student of high academic merit for graduate study and research in Engineering, Geology or Geophysics at the University of Alberta. Preference will be given to an applicant whose project is the field of the Petroleum Industry.

Apply to Administrator of Student Awards by March 1.

The Delta Delta Delta Alumnae Fellowship of $1,000.00 is offered annually by the Delta Delta Delta Alumnae of the University of Alberta, to a woman student of outstanding academic merit graduated from a degree program of the University of Alberta and proceeding in a full-time program towards a post-graduate degree either at this or any other accredited university. Preference will be given to a student in her first year of graduate work immediately following her undergraduate degree.

Apply to the Administrator of Student Awards by March 1.

The Robert Tegler Graduate Scholarship of $900 is open to graduates of the University of Alberta for graduate study at the University. The award will be based on academic standing and financial need.

Apply to Administrator of Student Awards by March 1.

The Zonta Club of Edmonton Scholarship of $250 will be awarded annually to a woman student, with high academic standing, enrolled for postgraduate studies at the University of Alberta, Edmonton in the fields of Social Sciences or the Humanities.

Apply to the Administrator of Student Awards by March 1.

The Henry Marshall Tory Memorial Scholarship of $300.00 is offered by the University of Alberta Alumni Association in honor of the first President of the University. It is intended to promote graduate study and research in fields related to mental health. It is restricted to graduates of the University of Alberta and will be paid only when the recipient registers for a full intramural program at the University of Alberta or at another approved graduate school.

Apply to Administrator of Student Awards by March 1.

The William Rea Scholarship of $1,000 is offered annually by William Rea, Jr. in honor of his father, a pioneer Edmonton educator. The scholarship is open to a University of Alberta graduate or graduating student who shows the best aptitude in terms of scholarship and extra-curricular activity for a television career in drama, music, writing, photography, engineering or business. The student may attend any recognized graduate school which will further his training in this area, and the scholarship may be renewed for one or more years in appropriate circumstances.

Definite details should be given as to the field of study in which the candidate desires to work.

Apply to Administrator of Student Awards by March 1.

The following awards are open in one Field of Study only (as listed alphabetically):

AGRICULTURE

The Canadian Sugar Factories Limited Scholarship of $500 is offered for graduate study in Agriculture at the University of Alberta with preference being given to research relating to irrigation farming.

Apply to the Administrator of Student Awards by March 1.

The Dan Baker Graduate Bursary of $300 is provided under the will of the late Dan Baker of Edmonton. It is open to graduates of the Faculty of Agriculture, University of Alberta, who are proceeding to postgraduate work at the University of Alberta. (In the event that no suitable candidate applies, the award may be made to an undergraduate on the same terms as for the Dan Baker Undergraduate Bursary.)

Apply to the Administrator of Student Awards by March 1.

CHEMISTRY

The Professor Osman James Walker Scholarship in Chemistry—See Undergraduate Awards, Department of Chemistry.

The Cave and Company, Ltd. Scholarship in Chemistry—See Undergraduate Awards, Department of Chemistry.

EDUCATION

The Du Pont Company of Canada Limited offers a scholarship of $1,500 to be awarded to: *either* (1) a graduate or graduating student in an honors course in science or Mathematics, or in a course in which science or mathematics has been a major subject, and who agrees to enrol for training as a secondary school science or mathematics teacher; *or* (2) a science or mathematics specialist already teaching in the secondary school and whose ability to teach science or mathematics would be improved by a year's postgraduate work. Both men and women are eligible. The scholarship is increased by $600 if the student is a married man. A supplementary grant of $300 will be paid to the University.

Detailed information and application forms are available from the office of the Dean, Faculty of Education, University of Alberta. Applications will be received at the same office until June 15.

The International Nickel Company of Canada Graduate Fellowship in Educational Administration of the value of $2,400 over 8 months is offered annually for graduate study in Educational Administration at the University of Alberta.

Application forms are obtainable from the Head, Department of Educational Administration, University of Alberta and should be returned by March 1.

The W. K. Kellogg Foundation Fellowships in Educational Administration. A few fellowships in amounts up to $2,400 on an eight-month basis are donated by the W. K. Kellogg Foundation, Battle Creek, Michigan. In addition, supplementary amounts up to $1,000 may be given to fellows continuing their program through the intersession. These awards are tenable at the Uni-

versity of Alberta by graduate students working on the Masters' or Doctors' level.

Application forms are obtainable from the Head, Department of Educational Administration, University of Alberta, and should be returned by March 1.

ENGINEERING

The Chemcell Limited Fellowship of $2,400 on a 12-month basis is offered annually to a graduate in Engineering to pursue post-graduate studies in Chemical Engineering at the University of Alberta. If the student is in a doctoral program the award may be renewed for a second term. In addition the donor will provide a grant of $600 to the Department to support the research recipient.

Apply to the Administrator of Student Awards by March 1.

The Sherritt Gordon Mines Limited Graduate Scholarship in Metallurgy of $2,000 will be offered annually to a student of outstanding merit doing post-graduate work in Metallurgy.

Apply to Administrator of Student Awards by March 1.

The California Standard Company Graduate Fellowship in Petroleum Engineering valued at $1,000.00 is offered annually to a graduate of a recognized university to undertake first year graduate study in Petroleum Engineering at the University of Alberta. Preference will be given to a male Canadian citizen. If no suitable candidate doing first year graduate study is available, consideration will be given to granting it to a student in other than first year.

Apply to the Administrator of Student Awards by March 1st.

The C.I.S.C. Graduate Fellowship in Civil Engineering of the value of $1,500 is offered by the Alberta Regional Committee of the Canadian Institute of Steel Construction to a graduate of the University of Alberta, to undertake first year graduate study at the University of Alberta, for research in structures.

In addition the donors will from time to time provide Testing equipment in structures to the Department of Civil Engineering.

Apply to the Administrator of Student Awards by March 1.

The Alberta Phoenix Tube and Pipe Limited Fellowship in Metallurgy of $1,000.00 is offered annually to a graduate of any recognized University to pursue postgraduate study in Metallurgy or Metallurgical Engineering at the University of Alberta.

Apply to the Administrator of Student Awards by March 1.

ENGLISH

The James Patrick Folinsbee Memorial Scholarship in Creative Writing of $800 will be offered annually to a graduate of outstanding ability whose primary interest is in the field of creative writing and who will be pursuing a post-graduate degree program in English Literature. The scholarship will be open to graduates of other universities to attend the University of Alberta or graduates of this University to attend here or elsewhere.

Apply to Administrator of Student Awards by March 1.

GEOLOGY OR GEOPHYSICS

The California Standard Company Graduate Fellowship in Geology or Geophysics valued at $1,000.00 is offered annually to a graduate of a recognized university to undertake first year graduate study in Geology, Geological Engineering, or Geophysics at the University of Alberta. Preference will be given to a male Canadian citizen. If no suitable candidate doing first year graduate study is available, consideration will be given to granting it to a student in other than first year. A supplementary grant-in-aid of $500.00 will be made to the department in which the fellow is pursuing graduate study.

Apply to the Administrator of Student Awards by March 1.

MEDICINE

The Alberta Tuberculosis Association Fellowship of $1,200.00 and a one-year subscription to the American Review of Respiratory Diseases are offered annually to a recent graduate in Medicine, who is eligible for license to practise, for the purpose of acquiring training in the field of Thoracic Diseases. It is stipulated that the holder of the Fellowship shall spend a year of study or research in Alberta, in a program approved by the Faculty of Medicine and the Association. The Faculty of Medicine will consult with the Association in awarding this Fellowship.

Apply to the Administrator of Student Awards by March 1.

The Doctor D. S. Macnab Bursary—The Calgary Associate Clinic has founded the Doctor D. S. Macnab Bursary of $250.00 available to recent graduates for the purpose of giving aid to postgraduate studies or research in Medicine or Surgery. Under special circumstances, it may be given to undergraduates.

It will be awarded by the Faculty of Medicine, and applications should be forwarded to the Administrator of Student Awards by March 1.

The Dorothy Jean Usher Memorial Scholarship for Medical Research—The Dorothy Jean Usher Memorial Scholarship for Medical Research consists of the income from a capital endowment of $10,000.00, given by Thomas Usher in memory of his daughter, a graduate of the University of Alberta School of Nursing. It is offered to a graduate or an undergraduate for research work in the Faculty of Medicine of the University of Alberta on some aspect of medicine, with preference given to investigations relating to leukaemia.

Apply to Administrator of Student Awards by March 1.

The University of Alberta Eye Research Fellowship of $5,000 per annum is offered to a medical doctor for post-graduate research under the auspices of the Retina Foundation—Institute of Biological and Medical Sciences in Boston, Massachusetts. A recipient may apply for renewal for a second or third year of work at the Retina Foundation. Applicants must be Canadian citizens and state an intention to return to Canada to practise.

Apply to Administrator of Student Awards, University of Alberta, Edmonton, by January 1 for the year beginning July 1.

The Vessie Heckbert Memorial—refer to Faculty of Medicine.

PHARMACY

The Warner-Lambert Graduate Fellowship of the value of $1,200 is offered annually to a student of outstanding merit undertaking graduate work in Pharmacy. A supplementary grant of $300 for equipment and supplies will also be made to the Faculty of Pharmacy.

The Pfizer Research Scholarship of the value of $300.00 is offered annually to a student of outstanding merit undertaking graduate work in Pharmacy.

PSYCHOLOGY

The Lamond, Dewhurst and Associates Ltd. Scholarship of $200 will be offered to a post-graduate student in the Department of Psychology at the University of Alberta, preferably to one who is studying in the field of Industrial Psychology.

Apply to the Administrator of Student Awards by March 1.

GRADUATE AWARDS MADE BY OTHER INSTITUTIONS

It is requested that any student who is awarded one of these, report such to the Administrator of Student Awards as a matter of information.

The following awards are open in two or more Fields of Study.

For awards in a single field, see later.

British Council Scholarships. Three scholarships are offered annually to graduates of Canadian universities to provide opportunity for advanced study or research in the United Kingdom. They are not primarily intended to enable the holders to obtain University degrees or other professional or practical qualifications, although with special permission they may be allowed to do so if this does not involve an extension of the scholarship period. Preference is given to candidates who are between 25 and 35 years of age. The scholarships are normally tenable from October 1st for one academic year of ten months or for two academic years (22 months). A full scholarship includes fares to and from the United Kingdom, tuition fees, personal maintenance grant, a grant for books and apparatus of £25 per annum and approved travelling expenses in the United Kingdom. The scholar must return to his own country at the end of his scholarship.

Prospective applicants should write for further information and application forms to The Canadian Universities Foundation, 75 Albert St., Ottawa 4, Ontario. Completed applications are due December 1 for scholarships commencing the following October.

The Canada Council Awards—These are provided in the fields of the arts (defined as architecture, the arts of the theatre, literature, music, painting, sculpture, the graphic arts and other similar creative and interpretative activities), the humanities and the social sciences.

The two categories of interest to students are as follows: (In some cases these are tenable either in Canada or abroad. In all cases application should be made direct to The Canada Council by the dates mentioned.)

1. Pre-Master's Scholarships. Value $1,500. December 15.
2. Pre-Doctor's Fellowships. Value $2,000. December 15.

Travel grants may be given in addition where necessary.

Further information may be obtained from the Administrator of Student Awards or by writing direct to The Canada Council, 140 Wellington St., Ottawa.

The Canadian Federation of University Women Fellowships. The Federation offers four fellowships annually to women who hold a degree from any Canadian University. The awards are based on evidence of character, intellectual achievement, and promise of success in the subject to which the candidate is devoting herself. The proposed place and plan of study must be approved by the Federation.

The four fellowships are as follows:

(1) **Travelling Fellowship** of $2,500. This is open to any woman student whose domicile is in Canada, although an applicant may be studying elsewhere at the date of application. Preference will be given to candidates who have completed one or more years of graduate study.

(2) **Margaret McWilliams Fellowship** of $2,000. This is open to applicants who wish to carry out post-graduate study or research abroad. Preference will be given to those who have already started their graduate study.

(3) **Junior Fellowship** of $1,500. This is open to any woman student who is not more than 25 years of age and whose domicile is in Canada.

(4) **Professional Fellowship** of $1,500. This is open to applicants whose domicile is in Canada. Preference will be given to candidates who have completed one or more years of professional work and who desire to spend a year at an accredited Library School, College of Education, or similar professional school.

Application blanks and further information may be obtained from the Chairman of the Fellowship Committee, Dr. Mae Smith, 2424 Crown Crescent, Vancouver 8, B.C. Applications and all other necessary documents must be received in Vancouver not later than February 1.

In addition the C.F.U.W. will select Canadian candidates for various awards granted by the American F.U.W. and the International F.U.W. Application dates are December 1 and November 1 respectively.

The Civil Service Association of Alberta Graduate Scholarship of $1,000 will be offered annually to a graduate of any recognized university for postgraduate study at either the same or any other recognized university. An applicant must be a member of the said Association or a son, daughter, husband or wife of a member. These is no restriction on field of study but preference will be given to an applicant whose research project is, in some measure at least, of interest and value to the Association.

Application forms may be obtained from the Executive Secretary, The Civil Service Association of Alberta, Terrace Building, Edmonton, and should be returned with supporting documents by March 1.

The Commonwealth Scholarships. This is a joint plan to exchange approximately one thousand postgraduate students within the Commonwealth. Each Commonwealth country accepts and provides for a certain number of students from other Commonwealth countries. Scholarships are normally for a period of two years and cover all expenses and travel.

Application dates vary for different countries, especially those in the Southern Hemisphere. Application date for those tenable in the United Kingdom will be October 31 of the year preceding the one in which the award is tenable.

Apply for information to Administrator of Student Awards.

Recent Commonwealth Scholars have been: 1961, Richard W. Bide, Ian K. Steele, Morley S. Lipsett, David G. Fish; 1962, Adolf Buse, A. Roy McKenzie, Walter A. Yakimets; 1963, Robert Church.

The Consolidated Mining and Smelting Company of Canada Ltd. Graduate Research Fellowships of $2,200.00 are offered annually to Canadian citizens for research at Canadian Universities towards a postgraduate degree in pure or applied science or agriculture bearing some relationship to the broad technical interests of the Company in the fields of Mining, Geology, Metallurgy, Chemistry, Chemical Engineering, Physics, Mathematics, Agriculture, and Electrical, Mechanical and Civil Engineering.

Ten fellowships will be offered—five tenable in Western Canadian Universities and five in Eastern Canadian Universities.

In addition, an $800.00 grant-in-aid will be provided for the Department concerned.

Application must be made on the approved forms and submitted to the Canadian Universities Foundation, 75 Albert Street, Ottawa 4, Ontario by February 1. Application forms and information are available at the Student Awards Office.

The 1851 Exhibition Science Research Scholarship—Three of these scholarships are granted each year in Canada. They are to the value of £750 (plus £250 provided by the National Research Council of Canada) per annum for two, or in rare instances, three years, together with certain possible allowances for fees and travelling expenses. The object of the scholarship is "to enable selected students of overseas universities who have already completed a full university course and given evidence of capacity for scientific investigation to devote themselves for two years to research work under conditions most likely to equip them for practical service in the scientific life of the Commonwealth."

A candidate must be (a) a British subject, (b) less than 26 years of age, except in very special circumstances, such as national service during the war. The candidate must have been a student of science in a university or university institution for a period of not less than three years, and must have spent one full academic year ending not more than twelve months prior to the date of recommendation at the institution by which he is recommended.

The scholarship is tenable in the United Kingdom or abroad, but not normally in a country in which the student has already studied.

Students intending to apply for this scholarship should communicate with the Administrator of Student Awards before February 1 so that applications may be in London by March 21.

The Imperial Chemical Industries and The Turner and Newall Research Fellowships. These fellowships are tenable at the University of London and are of the value of £1,000-£1,200 per annum for three years.

The Imperial Chemical fellowships are for study in Biochemistry, Chemistry, Chemotherapy, Engineering, Metallurgy, Pharmacology or Physics.

The Turner and Newall fellowship is for study in Engineering, Inorganic Chemistry or Physics.

Detailed regulations and applications may be obtained from the Academic Registrar, University of London, Senate House, W.C.I. They must be received complete by him by April 1.

The Imperial Order Daughters of the Empire War Memorial I Postgraduate Overseas Scholarship—The scholarship, founded by the Imperial Order Daughters of the Empire, as part of the war memorial of the order, is of the value of $2,000.00, tenable for one year in any university in the British Commonwealth, the subjects of study being specified as History, Economics or Constitutional Government, or any subject vital to the interest of the Commonwealth.

The selection of a candidate will take place during the month of November. The candidate selected must be prepared to begin his or her course in Great Britain in the following autumn.

Candidates may be men or women. They must be British born, naturalized allies, or naturalized neutrals, with at least five years' residence in Canada. Except in the case of a returned solider, sailor or airman, they must have passed their nineteenth but not their twenty-seventh birthday in October of the year during which they begin their course. Each candidate must hold a degree from a recognized university or degree-granting college in Canada and must have done or be doing postgraduate work. A candidate shall apply in the province in which the university from which he or she graduates is situated, irrespective of his or her place of residence in Canada. In provinces where there is no university, the War Memorial Committee in that province may grant the scholarship to a man or woman from that province who has graduated from any Canadian university or college and has done or is doing postgraduate work. Candidates from a province having no university may apply only in that province, not in the province where they are attending college or have taken a degree.

In choosing the scholars, the Committee of Selection will give consideration not only to literary and academic attainments, but also to personal character and physical fitness. If possible, personal interviews with the candidates will be arranged. Other conditions being equal, preference will be given to a returned soldier, his sister, son or daughter.

Application is to be made to the I.O.D.E. Scholarship Secretary, Mrs. D. McCulloch, 13105-104 Avenue, Edmonton, Alberta, not later than October 15.

Recent I.O.D.E. Scholars have been: 1959, Frederick G. Hulmes; 1960, John Irvin Daeley; 1961, John Irvin Daeley; 1962 and 1963, Donald E. Webber; 1964, Judith Rendle.

The Imperial Order Daughters of the Empire War Memorial II Postgraduate Overseas Scholarships—Four scholarships for Canada founded by the Imperial Order Daughters of the Empire, as part of their memorial for World War II, are of the value of $2,000.00 each and are tenable for one year in any university in the British Commonwealth, the subjects of study being specified as History, Philosophy, Classical and Modern Languages and Literature.

Candidates may be men or women, and must hold a degree from a recognized university or degree-granting college in Canada, and must have done or be doing postgraduate work. The terms of award are otherwise similar to those outlined above for the World War I Memorial Scholarship.

Graduates of the University of Alberta should make application to the I.O.D.E. Scholarship Secretary, Mrs. D. McCulloch, 13105-104 Avenue, Edmonton, Alberta not later than October 15.

Recent I.O.D.E. Scholars have been: 1959, Gordon R. Morisset; 1960, Gordon R. Morisset; 1961 and 1962, Lawrence P. Burns.

Imperial Oil Graduate Research Fellowships. The Imperial Oil Limited offers annually five research fellowships of $2,500 per year in Canadian funds for a period up to three academic years. Three fellowships are offered in the fields of Pure and Applied Science including Mathematics and two are offered in the Social Sciences and Humanities. These are open to graduates of any approved university in Canada and may be tenable at any university, approved by the donor, for graduate studies leading to a doctor's degree.

An annual grant of $1,250 per individual is made to each Canadian university at which Fellows are pursuing their research studies.

Universities wishing to sponsor one or more students should address their applications to the Imperial Oil Scholarship Committee, Imperial Oil Limited, 111 St. Clair Avenue West, Toronto 7, Ontario, by March 1.

Any student who wishes to be sponsored for this award should apply to the Administrator of Student Awards not later than February 15.

International Nickel Graduate Research Fellowships have been established to encourage academic research in the technical fields serving Canadian metal industries and to stimulate advanced study in industrial science in Canada. A number of fellowships of $2,500 each are tenable annually at Canadian Universities. In addition, a $500 grant-in-aid will be made to the Department in which the fellow is working. The normal tenure is one year but application may be made for renewal through second or third year. The fields of research are: Chemistry or Physics of Metals, Geology (including Geophysics and Geochemistry), Metallurgy (both Physical and Extractive including Mineral Dressing) and Mining.

Universities wishing to sponsor one or more students should address their applications to The International Nickel Company of Canada Limited, 55 Yonge Street, Toronto 1, Ontario, to reach it not later than February 14.

Any student who wishes to be sponsored for this award should apply to the Administrator of Student Awards not later than January 31.

The Johnson's Wax Fund Graduate Scholarship—The Johnson Foundation, Racine, Wisconsin, makes available annually to at least one graduating student registered at a Canadian University an award of a maximum value of approximately $1,800, according to need, to cover the cost of travel and one academic year of study at a United States University or College of the student's selection. The period may be spent in graduate study in any field.

Applications should reach the Administrator of Student Awards not later than December 15 so that they may be forwarded to Brantford, Ontario by January 15.

The Frank Knox Memorial Fellowships of $3,200, will be offered annually to two male Canadian citizens for one year's postgraduate study at Harvard University. Special consideration will be given to extra-curricular activities.

Applications must be made through the student's own University by December 1. Information may be obtained from the Student Awards Office.

The Massey Foundation Fellowships each of $2,000 to $2,500 per annum, are offered to Canadian citizens for graduate study at the American University, Washington, D.C. Applicants must have received, or be close to completing, a Bachelor's degree with high standing, and must be eligible for admission to graduate study at the American University. Fields of study are chiefly Arts and Science, Business Administration and Education. Applications fully documented, must reach the American University not later than March 1 of each year. For further information write to the office of the Graduate School, the American University, Washington 16, D.C. or contact the Student Awards Office.

The Mackenzie King Travelling Scholarships. Several scholarships of $1,500 each will be offered to graduates of Canadian universities for postgraduate study in the United States or the United Kingdom in the field of International or Industrial Relations (including Law, History, Politics or Economics).

Personal qualities and aptitudes will be considered as well as academic standing.

Apply to Dean Walter H. Gage, University of British Columbia, Vancouver 8, Canada, by March 1.

The National Research Council Scholarships—The National Research Council offers annually postgraduate scholarships on a twelve-month basis to graduates with pre-eminent ability in the sciences, mathematics, engineering and applied psychology. These are offered in four classes: Bursaries (in Canada only) to the value of $2,000; Studentships (in Canada only) to the value of $2,400; Special Scholarships (outside Canada) to the value of $3,000; Postdoctorate Overseas Fellowships (outside Canada and United States) to the value of $4,000 single and $5,000 married. Note: Effective Oct. 1., 1965 Bursaries will be increased to $2,500 and Studentships to $3,000.

In all cases a travel allowance is made where necessary.

Applicants must be Canadian citizens normally resident in Canada or foreign students who have been enrolled in a Canadian university for a minimum of 12 months at the time of application.

Application forms and general regulations may be secured from the Administrator of Student Awards, University of Alberta. Completed applications must be received by the Council in Ottawa by January 15.

The Rhodes Scholarship—A Rhodes Scholarship is tenable at the University of Oxford and may be held for three years. Since, however, the majority of Rhodes Scholars obtain standing which enables them to take a degree in two years, appointments are made for two years in the first instance, and a Rhodes Scholar who may wish to remain for a third year will be expected to present a definite plan of study for that period satisfactory to his College and to the Rhodes Trustees.

The stipend of a Rhodes scholarship is fixed at £900 per year. At most colleges and for most men this sum is not sufficient to meet a Rhodes scholar's necessary expenses for term time and vacations, and scholars who can afford to supplement it by say £50 per year from their own resources will find it advantageous to do so.

CONDITIONS OF ELIGIBILITY—A candidate, to be eligible, must:

1. Be a male Canadian citizen or British subject, with at least five years' domicile in Canada and unmarried. He must have passed his nineteenth, but not his twenty-fifth birthday on October 1 of the year for which he is elected.
2. Have reached such a stage in his course at one of the universities of Canada that he will have completed at least two years at the university in question by October 1 of the year *for* which he is elected.

In making nominations, Committees will have regard to the qualities laid down by Mr. Rhodes in that section of the Will in which he defined the general type of scholar he desired;

> Literary and scholastic attainments; qualities of manhood, truthfulness, courage, devotion to duty, sympathy for and protection of the weak, kindliness, unselfishness and fellowship; exhibition of moral force of character and of instincts to lead and to take an interest in his fellows; physical vigour, as shown by fondness for or success in manly outdoor activities.

Candidates may apply either for the province in which they have their ordinary private domicile, home or residence, or for any province in which they have received at least two years of their college education before applying.

Each candidate for a scholarship is required to make application to the Secretary of the Committee of Selection in the province in which he wishes to compete not later than November 1.

Full particulars can be obtained from Dr. J. Duby 10118 - 124 Street, Edmonton, Alberta, Secretary of the Selection Committee for the Province of Alberta.

Recent Rhodes Scholars have been: 1958, Gray Conrad Vernon; 1959, Morton Brown; 1960, Henry Russel Glyde; 1961, Bernard Leo Adell; 1962, John Peter Unrau; 1963, Sheldon Chumir; 1964; Wesley Cragg.

Rotary Foundation Fellowships. These are provided by Rotary International for graduate study in a country other than the student's home country. Applicants must be single, and must be over 20 but not over 29 years of age. Preference will be given to studies in the humanities, languages or social sciences but other fields will be considered.

The fellowship is for one academic year and covers return travel, tuition fees, books, living and incidental expenses. Rotary District No. 536, comprising Alberta and adjacent parts of Saskatchewan and British Columbia selects such a candidate every other year.

Application with supporting documents should be made by April 15 of any even-numbered year for the fellowship to begin in the next following odd-numbered year. Applications should be filed with the nearest Rotary Club. For further information contact the Administrator of Student Awards, University of Alberta or the nearest Club within the above-mentioned District.

Recent Rotary Fellows have been: 1959, Robert Roy Stuart (Oxford); 1961, Lawrence A. Mysak (Adelaide); 1963, Guy Doll (Poitiers).

Royal Society of Canada Research Scholarships—The Royal Society of Canada will award two types of research scholarships to Canadians for advanced work:

Pre-doctoral scholarships of $1,500.00 each in the humanities. The subject of investigation must, however, have been selected and preliminary work done on it, as the award cannot be given to assist in meeting course or examination requirements for the Ph.D.

Post-doctoral scholarships of $2,500.00 each for candidates who have obtained the degree of Doctor of Philosophy or equivalent in any branch of science or literature.

Copies of regulations and forms of application may be obtained from the Secretary, The Royal Society of Canada, National Research Building, Ottawa, Ontario. Applications and all supporting papers must be in the hands of the Secretary not later than January 1.

The Rutherford Scholarship of the Royal Society—of the value of £800 to £1,050 per annum plus allowances for travel and tuition fees is available for experimental research in any branch of the natural sciences, but if there are candidates of similar merit preference will be given to experimental physics.

Applications should be made not later than Febrary 1 on the Exhibition of 1851 forms.

Shell Postgraduate Scholarships. Two scholarships of £850 each per annum for two years are offered to male British subjects with at least 5 years residence in Canada, under 25 years of age and preferably unmarried. Travel assistance may be given.

These scholarships are tenable in an approved University in the United Kingdom in any of the following studies: Chemistry, Physics, Chemical Engineering, Engineering, Geophysics or Geology. The student should be working to a Master's or Doctor's degree and should already have completed or expect to complete one year of postgraduate study.

Information may be obtained from the Administrator of Student Awards and applications must be in Ottawa by January 3.

Soroptimist Federation of the Americas Inc. The Western Canada Region of the Federation offers a fellowship of $1,500 to a woman student, either graduating or a graduate, whose home is in Western Canada, and who is in need of financial assistance. The award is for the postgraduate study at any university. The award is normally made only every other year, in the even years.

Application forms may be obtained from the Administrator of Student Awards. They must be forwarded to the Federation by March 1. A decision will be made by June 30.

The Woodrow Wilson National Fellowships, each providing a stipend of $1,800 for one year, plus tuition costs and allowances for dependents, are available to outstanding students who are either undergraduates in their final year or graduates who have not yet entered a liberal arts graduate school. The intention of all applicants must be to prepare themselves by graduate study for a career in college teaching in the natural or the social sciences or the humanities. These are tenable in the United States or Canada.

In the first instance, candidates are nominated by faculty members. Since nominations must reach the officers of the Fellowship Foundation no later than October 31 for Fellowships tenable in the next academic year, intending candidates should get in touch with the head of the department concerned as early as possible in the first term.

Recent Woodrow Wilson Fellows have been: 1962, Adolf Buse, Kurt Rees; 1963, Morris Aizenman, Richard Mansfield, Ronald McClung, Gunter Muecke, John Ower, Ross Rudolph, Bastiaan van Fraassen, Thomas Wood; 1964, Patricia Clements, John Humphreys, Hans Reich.

The following awards are open in one Field of Study only, as listed alphabetically.

DENTISTRY

The Graduate Dental Research Fellowships—The National Research Council offers annually a limited number of Fellowships for promising graduates in dentistry who have spent at least one year in postgraduate training or who have had experience in research work. Applications must be received by the Council by February 1. Application forms and general regulations may be secured from the Administrator of Student Awards.

The Postgraduate Scholarship Fund in Dentistry has been established through the generosity of members of the Dental profession. The purpose of this fund is to assist dental graduates in pursuing postgraduate studies at other institutions in preparation for teaching. Younger persons will be given preference. Applications should be made to the Dean. All applications must submitted to the Council of the Faculty of Dentistry for approval.

The Canadian Dental Association Fellowships and Studentships. The Canadian Dental Association offers fellowships and studentships to suitable students or graduates who desire to prepare themselves further for scientific research by continuing their study in the sciences fundamental to their research fields.

(a) Fellowships are for an academic year of special study in the fundamental sciences or for travel to visit outstanding authorities or to attend research conferences.

(b) Studentships are for summer or part-time employment as an assistant in a recognized research laboratory.

Factors considered in making the awards are: evidence of capacity for original research, and scholastic ability in scientific fields.

The candidate shall state the institution at which he intends to study and the general line of work to be followed. A transcript of university record and a letter of recommendation from the dean of a dental school should accompany the application.

Apply to Canadian Dental Association, 234 St. George Street, Toronto 5, Ontario by April 1.

EDUCATION

The John Walker Barnett Fellowship in Education of $2,400 is offered to residents of Alberta, who are members of the Alberta Teachers' Association, and who are admitted to the Faculty of Graduate Studies of the University of Alberta for intramural study at a regular winter session on a

doctoral program in education. This fellowship is open to students enrolled for doctoral work in any one of the Departments of the Faculty of Education.

Application forms are obtainable from the Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton and should be returned by March 15.

The Alberta Teachers' Association Graduate Scholarships in Education, each in the amount of $500, are offered annually to students who, having graduated with a Bachelor of Education degree from the University of Alberta, are proceeding to graduate work. Each applicant must be a bona fide resident of Alberta. He must give evidence of superior academic and professional promise, capacity for leadership, and intention to follow teaching as a career. The scholarship is payable upon registration for intramural study during a regular session in the graduate school of a university of recognized standing, provided that such study be commenced not later than two years following the award.

Application should be made to the Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton, not later than May 15.

ENGINEERING

The Athlone Fellowships—Her Majesty's Government in the United Kingdom has established a number of Fellowships to enable Canadian engineering graduates to take postgraduate training in the United Kingdom. The fellowships will be in two groups:

(a) thirty-one available for graduates immediately after graduation;
(b) a further ten available for graduates who have already spent some time in industry.

The Fellowships will cover the costs of transport, tuition fees and maintenance and be tenable normally for a maximum period of two years.

Apply to the Administrator of Student Awards by October 15.

Recent Athlone Fellows have been: 1962, Douglas N. Davis, Robert L. Hemmings, Ronald H. Johnston; 1963, Walter C. Harrison, Joseph D. Wright; 1964, Robert Frederking, Cornelius Muilwyk.

Canadian Good Roads Association Scholarships—Several scholarships, each valued at $2,000.00 and tenable for one year, are offered annually through the Canadian Good Roads Association for graduate study in Transporation Engineering.

Applications should reach the Association at 270 McLaren Street, Ottawa, not later than April 15.

Further information may be obtained from the office of the Dean, Faculty of Engineering.

The Franki Fellowship, of $1,750.00 per year plus $250.00 to cover expenses in connection with the research, is offered by Franki of Canada Limited, for graduate research in the field of soil mechanics at a Canadian university. The fellowship is open to any graduate in civil engineering of a recognized university and preferably a Canadian citizen or a resident of Canada.

A candidate for this fellowship should document his application with a transcript of university marks, a statement of experience and a clear outline of

the research project contemplated. He should also request three or more instructors familiar with his work to send to the Administrator of Student Awards confidential staments indicating the merits of the applicant and their estimate of his ability to pursue graduate work. *A statement that the proposed research project could be carried forward satisfactorily at the University of Alberta is required from the head of the university department within which it would be conducted. A copy of the thesis is to be submitted to the donor.*

Applications should reach the Administrator on or before April 1, in order that they may reach the company not later than April 15. The decision of the company will be known not later than June 1.

Steel Company of Canada Fellowships in Metallurgy. Four fellowships of $2,000 each are offered annually to permanent residents of Canada who are graduates of a Canadian University, for research in Metallurgy. They are normally tenable for one year but in special circumstances may be renewed for a second year. In addition the donor provides a $1,000 grant-in-aid with each fellowship.

Further information may be obtained from the Administrator of Student Awards, University of Alberta. Completed applications must be sent to Canadian Universities Foundation, 75 Albert Street, Ottawa by February 28.

Alberta and Southern Gas Co. Ltd. Graduate Scholarship of $1,000 is offered annually for graduate study in Engineering at the University of Alberta. Preference will be given to an applicant whose research program will be in a field of specific interest to the natural gas industry.

Application forms may be secured from The Alberta Southern Gas Co. Ltd., 503 Natural Gas Building, Calgary, and must be submitted by March 1.

GEOPHYSICS

The Society of Exploration Geophysicists Scholarships—The Society offers annually four scholarships of $500.00 each to Canadians majoring in Geophysics at Universities in Canada. The award will be based on academic record and financial need. Applicants may be matriculants entering first year University or undergraduates or graduate students.

Application forms may be secured from Canadian Society of Exploration Geophysicists Scholarship Sub-committee, P.O. Box 117, Calgary, Alberta, and should be returned completed to the same address by March 15.

LAW

The Carswell-Sweet and Maxwell Scholarship in Law—From 1960 a scholarship will be offered to be open to all final year and postgraduate law students in Canada, and which will be tenable for one year at Cambridge University. The student will be required to do postgraduate work in Anglo-Canadian Law. The value of the scholarship will be $2,000.00 and the cost of travel to Great Britain and return will be paid in addition. Application forms may be obtained from the Dean of the Faculty of Law.

The Viscount Bennett Trust Fund Scholarship—Under the terms of a deed of gift to the Canadian Bar Association from the late Right Honorable Viscount

Bennett, P.C., K.C., LL.D., D.C.L., Honorary Life President of the Association, a trust fund known as the Viscount Bennett Trust Fund has been established. The annual income from the fund or the sum of $2,000, whichever is the less, will be paid annually as a scholarship for postgraduate study of law at an approved graduate school.

The scholarship is open to final year and graduate students of approved Canadian law schools, of which the Faculty of Law of the University of Alberta is one.

Applications for this scholarship should be received by the Dean of the Faculty of Law before October 15.

MEDICINE

The Medical Research Council Fellowships ranging from $3,000 to $5,000 are offered for advanced training and experience in research in the medical sciences. Applicants must be Canadian citizens or residents of Canada and be not over 35 years of age. Awards normally are tenable in Canada and are for 12 months beginning July 1.

Apply by October 1 or January 1 to Medical Research Council, National Research Building, 100 Sussex Drive, Ottawa 2, Canada. For further information inquire of the Dean of Medicine or the Student Awards Office.

NURSING

Professional Training Grants—Financial assistance is available to graduate nurses pursuing post-graduate study in any field of nursing. Applicant should be made to the Deputy Minister of Health, Department of Public Health, Administration Building, Edmonton, Alberta.

The University of Alberta Hospital School of Nursing Alumnae Association Scholarship—Financial assistance is available to graduates of the School to undertake post-graduate work in any field of nursing. Applications should be addressed to the Secretary of the Alumnae Association c/o, Office of Director of Nursing, University of Alberta Hospital.

SOCIAL WORK

The Mary A. Finlay Scholarship in Social Work of $1,000 per year for two years is provided by the Robert Tegler Trust for study in Canada, the United Kingdom or the United States, towards a Masters or Doctors degree in Social Work or related fields and will normally be awarded every alternate year. The second year will be dependent on satisfactory completion of the first year.

Applicants must be residents of the Province of Alberta and recipients will be required to agree to work in their profession within the Province for at least two years immediately upon completion of their advanced study.

Apply in writing with two letters of recommendation to the Trustees of the Robert Tegler Trust, 602 Tegler Building, Edmonton, by January 1 of the year in which the award is to be made. Inquiry should be made of the donor to determine in which year it will be available.

The Imperial Order Daughters of the Empire Bursary in Social Work of $500.00 is offered to a graduate of the University of Alberta to take training at any recognized School of Social Work in Canada. When a successful candidate

undertakes to two year program leading to a Master of Social Work degree, such candidate may apply for re-appointment for the second year. The application will be in open competition with those submitted for the first year of study.

Academic standing, suitability of personality, good health and financial need will be major considerations in determining this award.

Application forms may be secured from the I.O.D.E. Scholarship Secretary, Mrs. D. McCulloch, 13105-104 Avenue, Edmonton, Alberta and should be submitted to her on or before June 1.

The Junior League of Edmonton Bursary for Post-Graduate Study in Social Work of an amount up to $1,000 is offered to a graduate of any recognized University to assist training at an accredited School of Social Work. The winner shall agree to work in an approved Social Welfare Department or Agency in the City of Edmonton for a period of one year immediately following completion of course. The bursary will be awarded on the basis of academic proficiency, suitability of personality and financial need. Preference will be given to those who have already been employed by a Welfare Agency.

Application forms should be secured from Miss Helen Steinbach, 9843-64 Ave., Edmonton, and should be completed and returned to her by June 1.

The Kinette Bursary in Social Work up to the amount of $500.00 is offered by the Kinette Club of Edmonton to graduates of the University of Alberta, or to a graduate of another university resident in Alberta to take training at any recognized School of Social Work in Canada. Preference will be given to an applicant who intends to work in the Province of Alberta. Academic proficiency, suitability of personality and financial need will all be considered in making the award.

Application should be submitted by June 1 to Mrs. J. Macaulay, Chairman, Bursary Committee, Kinette Club of Edmonton, 7404 - 151 Street, Edmonton, Alberta.

The Quota Club International District 11 Bursary in Social Work of $350.00 is offered annually to a woman student proceeding towards a degree in Social Work at a recognized School of Social Work in Canada. The bases of award are academic standing and financial need. Applicants may be from Manitoba, Saskatchewan or Alberta and the award will normally, but not necessarily, be rotated among these three provinces. Applicants may be recent graduates or persons who have already served in the field.

Application forms should be obtained from, and returned to, the Chairman, Scholarship Committee, Miss Nell Warning, Suite 9, 9921-104 Street, Edmonton, Alberta, by May 31.

The P.E.O. Memorial Scholarship in Social Work of the value of $100.00 is offered by the P.E.O. Sisterhood, Alberta Chapters, to a graduating woman student who intends to pursue studies in social work. The scholarship will be awarded to a student who attains at least second-class standing in her final year and will be paid only when she produces satisfactory evidence of registration in a recognized course of social work.

Apply to the Administrator of Student Awards by June 1.

WILDLIFE MANAGEMENT

C.I.L. Wildlife Management Fellowships—Fellowships of the value of $1,500, of which $1,200 is paid to the student and $300 to the Department in which the student is working, are available to any university graduate undertaking post-graduate studies in wildlife management at a Canadian university. Fellowship holders may receive summer grants to finance field work and provide additional income.

Applications should be forwarded by March 30 to Mr. S. J. Smart, Secretary of the Advisory Board, P.O. Box 10, Montreal.

PROVINCE OF ALBERTA ASSISTANCE

I. DEPARTMENT OF EDUCATION

Under the Students Assistance Act (The Queen Elizabeth Education Scholarship Fund) asistance in various forms is available to students at the University of Alberta.

For matriculants and undergraduates this assistance is also available for attendance in a course of University level at a Junior College which is affiliated with the University of Alberta, or at an approved College or University elsewhere if the course is not given at the University of Alberta.

It is expected that students who might need financial assistance and whose homes are in Calgary or Edmonton will attend the campus in their home city if the program is avialable there.

For graduate study the assistance is available only for attendance in the Faculty of Graduate Studies at the University of Alberta.

Matriculants and undergraduates must be bona fide residents of Alberta.

Applicants must be full-time day students in a regular academic session.

Province of Alberta Matriculation Scholarships

Three hundred scholarships are provided for students entering University the first time who had a matriculation average of 75% or better.

For details, see Matriculation Awards.

Province of Alberta Undergraduate Scholarships

Three hundred scholarships are provided for undergraduates with an academic standing in the previous year of 75% or better.

For details, see Undergraduate Awards.

Province of Alberta Graduate Fellowships

Three fellowships of $3,600 each.

For details, see Graduate Awards.

Province of Alberta Graduate Scholarships

Ten scholarships of $2,200 to $2,600 each.

For details, see Graduate Awards.

Province of Alberta Graduate Tuition Bursaries

Twenty-five are provided for the amount of fees.

For details, see Graduate Awards.

Grants and Loans

These are available on a basis of financial need only. The amount of a grant depends on the academic standing of the previous year. A loan may be granted either in conjunction with, or separately from, a grant. Loans are repayable to the Provincial Government.

Matriculants must have an average of at least 60%.

Application should be made to The Secretary, Students Assistance Board, Provincial Department of Education, Administration Building, Edmonton.

Undergraduates must have a previous year average of at least 60% for grants and at least 50% for loans.

Application should be made to the Administrator of Student Awards, University of Alberta, Edmonton, or to the Student Counselling Services Office, Calgary.

Students who anticipate that they will need financial assistance any time during the session should apply as follows:

Medicine and Dentistry—by September 15.

Other Faculties—by October 1.

However, further applications will be accepted up to January 4 from students who could not anticipate their needs earlier. Only in cases of emergency can applications be considered after January 4.

Applications from students with over 50% but repeating a full year will not be considered in the fall, but may be considered in January in which case mid-term examination results will be a determining factor.

Students should note that payment of Grants and Loans will not be available for about eight weeks after the closing date for applications and should plan their financing accordingly, especially with reference to payment of fees.

Graduate Students must have an average of at least 65% for either grants or loans.

Apply to Administrator of Student Awards early in the fall session or in January.

Assistance for Teacher Education

Special financial assistance is available in some years for Faculty of Education students.

For details refer to Province of Alberta Assistance under the Faculty of Education.

II. DEPARTMENT OF HEALTH

Dental Auxiliary Bursaries. Bursaries are available for students enrolled in the Dental Auxiliary program. They cover tuition fees, a monthly living allowance and a small book allowance. In return for the bursaries the recipients must undertake to work in a Health Unit in Alberta for 2 years.

Apply to the Director, School of Dental Hygiene.

III. DEPARTMENT OF PROVINCIAL SECRETARY

Scholarships at various levels of study are available in Drama, Handicrafts, Librarianship, Music and Recreation (including Fine Arts, Psychology and Sociology). There are various application dates. For further information apply to the Administrator of Student Awards, or direct to Department of the

Provincial Secretary, Cultural Activities Branch, 425 Legislative Bldgs., Edmonton.

Among these scholarships is the following:

Recreation Scholarships—The Government of Alberta is offering scholarships ranging from $200 to $500 to candidates wishing to take further training in Recreation. These scholarships are open to students entering their graduating year in Physical Education at the University of Alberta and to graduates of the University who have shown an active interest in Recreation through provision of leadership in that field, expect to enter the Recreation profession in Alberta, show a high level of scholarship ability and possess high qualities of personality and character.

Application should be made to: Department of Provincial Secretary, Cultural Activities Branch, 425, Legislature Bldg., Edmonton, Alberta, before March 31.

OTHER FORMS OF FINANCIAL ASSISTANCE

University Student Loan Fund—Through the generosity of private donors the University has at its disposal a Loan Fund from which loans may be made to students attending the University of Alberta, who could not otherwise complete their studies. In special circumstances loans may also be considered for Alberta students taking courses at an institution of University level elsewhere. Applicants must be making satisfactory academic progress. Interest at 5% per annum will be charged on loans. The money to establish this fund has been largely donated by Engineered Buildings, Limited, Calgary.

Apply to Administrator of Student Awards, Edmonton or Student Counselling Services Office, Calgary.

Leonard Foundation Scholarships—The income of a trust created by the late Lieut.-Col and Mrs. R. W. Leonard, St. Catharines, Ontario, will be expended in paying part of the college expenses of selected students at several institutions of Canada, including the University of Alberta, for from one to four years. The details of qualification and the procedure of application for these scholarships may be secured by corresponding with the trustees of the Leonard Foundation, the Canada Permanent Trust Company, Toronto, Ontario, or with the Administrator of Student Awards of the University of Alberta. It is desirable that applications be filed in January as the last date for their receipt in Toronto is March 31 of each year.

Terwillegar Memorial Fund—This fund was established by Dr. Norman L. Terwillegar in memory of his only sons, Norman Allin, who was killed while serving with the British Navy, and William Robert, who served in the Royal Canadian Air Force and who died while attending Queen's University; both were former students of the University of Alberta.

The proceeds of the fund will be available to suitably qualified students in Medicine or Engineering in the form of loans, free of interest to the date of graduation. Application forms and further information may be obtained from the Deans of Medicine and Engineering.

The American Dental Trade Association has made available a sum of $700 annually to be issued as loans to students who have entered, or are about to enter, the final year in the Faculty of Dentistry and who require financial assistance. Application should be made to the Dean.

Viscount Bennett (The Law Society of Alberta) Bursaries—The late Right Honorable Viscount Bennett, P.C., K.C., LL.D., D.C.L., of Calgary and Mickelham founded a trust with the Law Society of Alberta to support awards to students and graduates in the Faculty of Law at the Universtiy of Alberta. Bursaries may be awarded from time to time by a special committee of the Law Society. Applications, accompanied by verifiable statements of the applicant's financial position, may be made at any time to the Dean, Faculty of Law.

Medical Class of '41 Loan Fund—A fund has been established by the Medical class of '41 from which small loans may be made at the discretion of the Dean of Medicine. Inquiries should be made at the office of the Dean of Medicine.

Kellogg Foundation Fund Loans—Through the generosity of the Kellogg Foundation of Battle Creek, Michigan, a sum of money has been made available to serve as a revolving fund to provide a limited number of loans to needy students in Medicine or Dentistry. For particulars in regard to these, apply to the Dean of Medicine or Dentistry.

Children of War Dead (Education Assistance) Act—This act provides fees and monthly allowances for children of veterans whose death was attributable to military service. Enquiries should be directed to the nearest district office of the Department of Veterans' Affairs.

R.C.A.F. Benevolent Fund—The Royal Canadian Air Force Benevolent Fund has made provision for loans for the benefit of former R.C.A.F. personnel or their dependents. For information apply to Mr. A. L. Robertson, P.O. Box 640, Federal Building, Edmonton, or Mr. W. B. Cheeseman, Department of Veterans Affairs, 810 - 3rd Street, S.W., Calgary.

The P.E.O. Educational Loan Fund—This fund has been established by the P.E.O. Sisterhood for the purpose of assisting young women, properly and satisfactorily recommended and desiring to complete their higher education with a view to becoming self-supporting.

Loans are not made for a longer term than five years. They shall not exceed $500.00 to any applicant for one year of study or $1,000.00 for two or more years of study. The rate of interest is 3%. Since arrangements for loans require considerable time, applications should be placed as early as possible, preferably by August 1.

Further information concerning this loan fund may be secured from the Administrator of Student Awards.

The Polish Canadian Students Assistance Fund of Alberta.—The Polish Community of Alberta has provided a fund for a limited number of prizes, bursaries and loans. These are for students at the University of Alberta in any year or course, or for matriculants entering first year. Such students must be of Polish origin and should be interested in making a contribution to the understanding of Polish culture and to the development of Polish Community affairs. Both academic standing and financial need will be considered. The recipients will be chosen by the donors.

Apply, giving full particulars, to the Administrator of Student Awards by September 30.

The Harry F. Bennett Educational Fund—This loan fund has been established by members of the Engineering Institute of Canada in memory of the late Harry F. Bennett, M.E.I.C.

Loans from this fund are available to deserving students in the Faculty of Engineering who have successfully completed their first year and are in need of

financial assistance. The maximum loan in any year is $250.00 and for all years $450.00.

Application forms and further information concerning this loan fund may be obtained from the Dean of Engineering.

The Association of Professional Engineers of Alberta Student Loan Fund. The Association has provided a fund from which loans may be made to students in Engineering, Geology or Geophysics. This fund is designed for emergency loans and generally students should have exhausted the other normal sources first.

Apply to the Dean of Engineering or the Head of the Department of Geology or of Physics.

UNIVERSITY OFFICER TRAINING UNITS

THE REGULAR OFFICER TRAINING PLAN

Introduction

The Regular Officer Training Plan (ROTP) is in operation in the Canadian Services Colleges and in Canadian universities. The plan is a form of mutual assistance to the armed forces and to young Canadians seeking advanced education.

Under ROTP, successful applicants who have completed senior matriculation are enrolled in the armed force of their choice, and are provided with university training. Students who are selected for the ROTP whilst attending university will be enrolled in the armed force of their choice while continuing their university studies.

Training in the ROTP is divided into two phases each year. Cadets will attend their university for the academic term and then will be sent to a unit of the forces in which they have been enrolled for summer practical training.

Academic Training

In general terms it can be stated that all courses which are applicable to business and industry are also applicable to the armed forces. Courses are, therefore, offered in the following broad patterns:

Engineering—Civil, Mechanical, Electrical, Aeronautical, Engineering Physics, Chemical.

Arts—General, Honors

Science—General, Honors

Specialist Courses—Other specialist courses required by the armed forces. (If any course exceeds four years, the student will be accepted in his final four years.)

The greatest requirement is for technically qualified officers, so that the major proportion of selected candidates will be required to accept training in engineering and science faculties.

Conditions of Service

Successful applicants will be enrolled as Naval Cadets in the Royal Canadian Navy, or Officer Cadets in the Canadian Army or the Royal Canadian Air Force, according to their choice. They will attend the college or university selected. Undergraduates will complete the summer practical training program as do the reserve personnel of the appropriate university—Naval Training Division (R.C.N), Canadian Officers' Training Corps (Canadian Army), or University Reserve Training Plan (RCAF).

On successful completion of academic and military training, cadets will be promoted to commissioned officer rank in the regular force. *Release, if desired, will be granted after three years' commissioned officer service beyond graduation.*

Cadets are obliged to maintain good standing academically in college and throughout military training. A cadet who fails a year, or who lacks adequate standing in any subject of a previous year, loses his benefits. He may, on the recommendation of the faculty and the service concerned, be permitted to attend a year at his own expense and may, if successful, be reinstated.

Financial Assistance

The cost of tuition and other essential fees will be borne by the Department of National Defence. The scale of pay and allowances for cadets under this plan is:

During the periods of attendance at university (academic year), cadets receive:

	Per month
Pay	$ 73.00
Subsistence Allowance (where food and lodging is not provided)	65.00
TOTAL	$138.00

During the period of practical summer training, cadets receive:

Pay	$ 73.00

(Plus free rations, quarters and travel)

An allowance of $75.00 per year is made for the purchase of books and instruments.

An allowance of $75.00 per month is made during flying training to all RCAF aircrew trainees.

Free medical and dental care and annual leave with full pay and allowances will be received throughout the entire training period.

Admission Requirements

Applicants who possess the following qualifications will be considered:

Citizenship—Canadian citizen; British Subject resident in Canada, with status of landed immigrant.

Marital Status—Must be single and remain so during academic training.

Medical—Must be fit for enrolment in the branch and service of his choice.

Age—Candidates must have reached sixteenth but not twenty-first birthday on January 1 of year of entry into University.

Education—Acceptance for entrance to the University of Alberta without condition.

Selection of Candidates

As future officers of the armed forces, applicants for the ROTP will appear before military interview boards for selection and will be assessed on their academic abilities, personality, character, appearance and leadership qualities.

How to Apply

Application should be made through the Officer Commanding the unit in which the applicant is interested. Offices for all three services are located in the Armed Forces Building, University Campus.

Medical Subsidization Plan

Scope

This plan applies to the three Armed Services. The plan provides for subsidization of medical students during the final three years of university and the interne year. Application may be made at any time after the commencement of the third from last academic year up to the end of the interne year.

Status

Applicants are enrolled in their initial year as an officer cadet (or equivalent). On successful completion of the first academic year under the plan, and the following summer, the student is promoted to Second Lieutenant (or equivalent).

Benefits	As Officer Cadet	As Second Lieutenant Single	As Second Lieutenant Married
Pay of Rank	$ 73 per mon.	$235 per mon.	$235 per mon.
Marriage Allowance	.....	.....	40 per mon.
Subsistence Allowance	65 per mon.	75 per mon.	110 per mon.
Totals	$138 per mon.	$310 per mon.	$385 per mon.

In addition all fees are paid and the student receives a grant of $75.00 for books and instruments.

Free medical and dental care and annual leave with pay are provided.

Promotion and Terms of Service

After interneship and registration with a Provincial College of Physicians and Surgeons, the officer is promoted to the rank of Lieutenant, Captain or Flight Lieutenant and will be required to serve a period of full duty for 3 years as a commissioned officer.

Dental Corps Subsidization Plan

Scope

Dental undergraduates may apply for subsidization under this plan at any time after entering course leading to the degree of Doctor of Dental Surgery, or upon being qualified to enter into such a course, i.e. applicants may not be enrolled until they are within 45 months of being qualified to receive a licence to practise dentistry.

Status

An applicant accepted under this plan will be enrolled in the Canadian Army (Regular Force) in the Royal Canadian Dental Corps for a fixed term in the rank of Second Lieutenant if in his penultimate or final year of his course in dentistry or, if he has not yet entered his penultimate year, in the rank of Officer Cadet.

Benefits	As Officer Cadet	As Second Lieutenant Single	As Second Lieutenant Married
Pay of Rank	$ 73 per mon.	$235 per mon.	$235 per mon.
Marriage Allowance	.....	.....	40 per mon.
Subsistence Allowance	65 per mon.	75 per mon.	110 per mon.
Totals	$138 per mon.	$310 per mon.	$385 per mon.

In addition all fees are paid and the student receives a grant of $75.00 for books.

Allowance will be made for the full cost of expendable instruments and supplies for the four years, as approved by the Faculty of Dentistry.

Free medical and dental care and annual leave with pay are provided.

Promotion and Terms of Service

Upon successful completion of his course and obtaining his licence to practise dentistry, a candidate under this plan will be promoted as a dental officer to the rank of Captain effective 1 June of that year, and shall serve thereafter for a fixed period of five years from the date of such promotion.

RESERVE OFFICER TRAINING PLANS

University Naval Training Division

The purpose of the University Naval Training Divisions is to select and train university students for commissioned rank in the Royal Canadian Navy (Reserve).

Admission Requirements

(a) The candidate must be a Canadian citizen, or British subject resident in Canada with the status of a landed immigrant.
(b) He must be medically fit, possess the required officer-like qualifications and have a sound academic record.
(c) He must be 17 but not over 22 years of age prior to December 31 in the year of his enrollment in the UNTD.
(d) He must be registered in the first or second year of university work.

Method of Enrollment

Students should apply for enrollment in the UNTD during the first 2 weeks of registration. An infomation centre is located on the campus during certain days of the week of registration. An officer is in attendance to assist all interested students. In addition, students interested in a career as either a Permanent Force Naval Officer or an officer in the Royal Canadian Navy (Reserve) may apply to the Department of Co-ordination and Placement for further information.

Selection Boards

Students who join the UNTD are entered as probationary cadets on the Active List of the Royal Canadian Navy (Reserve) and during January of their first year appear before a Selection Board to determine their suitability for commissioned rank. Successful candidates are promoted to the rank of Cadet in the Royal Canadian Navy (Reserve).

Training Programme

(a) During the academic year the UNTD training programme consists of one training night a week commencing in late September. The training is carried out through the media of lectures and instructional films and requires three winters to complete.
(b) During the summer Cadets must train a minimum of 17 weeks during their first two summers in ships and establishments of the Atlantic

Command. The third summer training period is optional. Cadets may avail themselves of the opportunity to serve longer than 17 weeks each summer if they so desire.

Rates of Pay

(a) During winter training Cadets may receive up to 16 days' pay for attendance on training nights or a maximum of one hundred and twenty dollars ($120.00).

(b) During the summer training Cadets may receive pay at the rate of $225 per month plus transportation and travelling expenses. In addition, rations, quarters, and medical services are supplied.

General

(a) Cadets are issued with all required uniforms.

(b) When a Cadet has successfully completed three winters and two summers he will appear before a promotion board for his final assessment for commissioned rank. If he passes this board, he will be promoted to Sub-Lieutenant at the commencement of the next academic year.

CANADIAN OFFICERS TRAINING CORPS (University of Alberta Contingent)

The COTC Programme

The purpose of the Canadian Officers Training Corps programme is to provide a means whereby university undergraduates can qualify for appointments in the Canadian Army, Regular Force or Reserves, as a commissioned officer.

The training programme, which covers a minimum of two years, consists of two portions, a theoretical part taken at the university during the academic year and a practical part taken during the summer at a Regular Force Army establishment. The theoretical phases at the university consist of 64 periods of instruction spread throughout the academic year. Candidates usually progress through three such phases in consecutive years. The practical portion taken during the summer at a school or unit of the Regular Army consists of 12 to 22 weeks of instruction with pay.

Qualification

Military qualification awarded as a result of theoretical and practical phase training is as follows:

Training Phase Completed	*Qualification*
one theoretical and one practical	Lieutenant Militia
two theoretical and two practical	Second Lieutenant Regular Force Lieutenant Militia
three theoretical and three practical	Lieutenant Regular Force Captain Militia

Eligibility

To enrol in the COTC a student must be:

(a) a Canadian citizen or British subject with landed immigrant certificate;
(b) physically fit and between the ages of 17 and 33;
(c) able to qualify as a second Lieutenant before graduation.

Some Corps of the Army will accept students from any faculty and up to the maximum age listed. In others there are certain limitations. For example the Corps of Royal Canadian Engineers and the Royal Canadian Electrical and Mechanical Engineers will only accept students registered in engineering. The Army Resident Staff Officer should be consulted for complete and up to date information.

Female applicants in first year Household Economics **only** may be enrolled in the Royal Canadian Army Medical Corps for training as Dietitians.

Rank and Status

All candidates are enrolled as officer cadets. After successful completion of two theoretical and two practical phases of training officer cadets are commissioned in the rank of second lieutenants. On the completion of three theoretical and practical phases of training and attainment of a degree, second lieutenants are eligible for immediate appointment to the Regular Army or Militia in the rank of lieutenant.

Pay

During the summer training periods COTC officer cadets and second lieutenants receive $225.00 pay each month. They are also provided with free room and board, uniforms and medical care. First class transportation to the place of summer training and return is provided free of charge.

During the winter training period, up to 16 days pay plus any additional amounts authorized may be earned.

Application and Enrolment

Students who are interested should apply as early as possible to the Army Resident Staff Officer located in the Armed Forces Building, Universitp Campus. Applications may be accepted as late as January 15th.

ROYAL CANADIAN AIR FORCE (University Squadron)

Object

R.C.A.F. University Squadrons were formed at the major Canadian universities to promote a strong liaison and mutual understanding between the universities and the Royal Canadian Air Force. These squadrons will provide a flow of trained university graduates into the R.C.A.F. Regular or Reserve as commissioned officers.

Qualifications

Specific qualifications for enrolment in the University Reserve Training Plan are as follows:

(a) Age. A male applicant must have reached his 16th but not his 26th birthday on date of application. A woman applicant must reach her 18th

birthday prior to commencement of her first period of summer training. Applicants under 18 years of age must produce the written consent of a parent or guradian.

(b) Medical category as established by the R.C.A.F.

(c) Marital Status. A male applicant may be married or single. A woman applicant must be single.

(d) Citizenship. An applicant must be a Canadian citizen, or a British subject permanently resident in Canada with the status of "landed immigrant".

Note: British subjects resident in Canada on a "student" or other visa are not eligible for enrolment.

Application

Application forms may be obtained at the Squadron Office. The selection of Flight Cadets for the University Squadron will commence at the beginning of the fall term and terminate January 31.

Training Program

The three year training program consists of formal training and supervised employment at R.C.A.F. schools and stations for a minimum of seventeen weeks and a maximum of twenty-two weeks each summer provided it can be completed during the period 15 April to 15 September. In addition, Flight Cadet and Pilot Officer members of the squardron attend weekly lectures and parades during each of the three winter terms preceding summer training.

Officer Development

During the first summer of training, all Flight Cadets undergo an initial Basic Officer Development Course at the R.C.A.F. Reserve Officers' School, in which they receive instruction in the duties, requirements and responsibilities of junior officers. This training involves the military, executive and development phases, which, besides the military and executive aspects of the R.C.A.F., are designed to train students as leaders who are well informed in world affairs and the role of Canada's defence forces in the current political and military situation, who are able to express themselves clearly, and effectively, and who will make good officers and good citizens

Formal Training

Most technical list and non-technical URTP Flight Cadets, on completion of the Basic Officer Development Course, proceed to R.C.A.F. schools to commence formal Air Force courses in their designated branches.

Winter Training Program

During the academic year, members of the University Squadron attend weekly lectures on orientation, executive and officer development subjects. The first winter's lectures are preparatory to entry into URTP and the Air Force. Lectures given during the second and third winters extend and amplify knowledge acquired during the officer development phases of summer training. Emphasis is placed on the integration of social and military sciences and the determination of their application to current affairs.

Officer Employment

Flight Cadets in those branches for which formal courses are not given during the summer months are employed in an "understudy" capacity at vraious units. This employment, which commences at the Officer Development Course, provides the students with experience in Air Force procedure and operation and allows them to observe the application of what they are taught at the Reserve Officer's School.

Status

Accepted university students are appointed in the R.C.A.F. Primary Reserve (University List) in the rank of Flight Cadet.

Flight Cadets have the status of subordinate officers for all purposes and wear the rank of Pilot Officer.

After successful completion of three summers of training and subsequent graduation from university, Pilot Officers may be appointed to the R.C.A.F. Regular, Auxiliary or Supplementary Reserve in the rank of Flying Officer.

Pay

Flight Cadets are paid at the rates prevailing for pilot officer. Net earnings for each summer employed vary between $750 and $1,200, depending on the length of duty. Winter pay is according to attendance at lectures and parades and amounts to approximately $100 if all sessions are attended.

Medical and dental care is provided during summer employment and first class rail transportation is issued on posting. Flight Cadets are issued with full kit of uniform for summer and winter wear upon acceptance.

For detailed information concerning Reserve University Squadron and R.C.A.F. (Regular), consult the Commanding Officer of the Squadron or the Resident Staff Officer (R.C.A.F.)

XXIV

General Organization of the University

GOVERNING BODY OF THE UNIVERSITY OF ALBERTA

VISITOR

THE HONORABLE JOHN PERCY PAGE, B.A., B.C.S., LL.D., Lieutenant-Governor of Alberta.

The Lieutenant-Governor of the Province, as representative of Her Majesty the Queen in right of the Province, is *ex officio* the Visitor of the University.

CHANCELLOR

FRANCIS PHILIP GALBRAITH, LL.D. (To August 15, 1970)

The Chancellor is elected for a term of six years by the members of Convocation. He is the chairman of Convocation and of the Senate, confers all degrees, and is *ex officio* a member of the Board of Governors.

PRESIDENT

WALTER HUGH JOHNS, B.A., Ph.D., LL.D., D.èsL.

The President is the chief executive officer of the University. He is appointed by the Lieutenant-Governor in Council. Te is entrusted with the general supervision of the academic work of the University and of the teaching staff and of the administrative staff concerned with academic work.

THE BOARD OF GOVERNORS

CHARLES MALCOLM MACLEOD, Q.C., LL.B., LL.D., Chairman. (Current term expires May 13, 1967).

Statutory Members

FRANCIS PHILIP GALBRAITH, LL.D., Chancellor of the University.
WALTER HUGH JOHNS, B.A., Ph.D., LL.D., D.èsL., President of the University.
HERBERT S. ARMSTRONG, M.A., Ph.D., F.R.S.C., President, University of Alberta, Calgary.
DONALD RUSSELL STANLEY, B.Sc., D.Sc., President of the Alumni Association.
JOHN EDWARD BRADLEY, M.D., Vice-President of the Alumni Association.
FREDERICK GAVIN STEWART, Esq., Deputy Provincial Treasurer.
WILLIAM HERBERT SWIFT, B.A., M.A., B.Ed., Ph.D., Deputy Minister of Education.

Appointed Members

To retire May 13, 1967:
A. G. BAILEY.
LOUIS A. DESROCHERS.
JOHN HOWARD KELLY, Esq.
MRS. M. L. McCULLOUGH.
F. CLARENCE MANNING, B.A.

To retire April 30, 1965:
HERBERT THOMAS HARGRAVE, B.E.

Secretary

JOHN MACLEAN WHIDDEN, B.Com., Bursar of the University.

The Board of Governors is a body corporate under the name and style of "The Governors of the University of Alberta". The board consists of the Chancellor, the President of the University, the President and Vice-President of the Alumni Association, the Deputy Provincial Treasurer, the Deputy

Minister of Education, The President of the University at Calgary, and the chairman and six other persons appointed by the Lieutenant-Governor in Council.

The conduct, management, and control of the University and all its property, revenue, business, and affairs are vested in the Board. The Board appoints the deans of all faculties, all members of the teaching staff, the Librarian, the Bursar, the Registrar, and all members of the administrative staff, but no dean of any faculty nor any member of the teaching staff of the University may be appointed unless first nominated by the President of the University. The board provides for the maintenance of buildings and the erection of new buildings. It has authority to purchase and acquire such property as it may deem necessary for the purposes of the University. It fixes the various fees charged in connection with university courses and it makes financial provision for the establishment of new faculties, departments, and courses.

All residuary powers, which by the terms of the University Act are not specifically granted to any other person or body of persons, are vested in the Board of Governors. The Board makes an annual report to the Lieutenant-Governor in Council. This report is transmitted to the Legislative Assembly of the Province by the Minister of Education.

THE SENATE

Statutory Members

FRANCIS PHILIP GALBRAITH, LL.D., Chancellor of the University.

WALTER HUGH JOHNS, B.A., Ph.D., LL.D., D.èsL., President of the University.

CHARLES MALCOLM MACLEOD, Q.C., LL.B., LL.D., Chairman of the Board of Governors.

HERBERT STOKER ARMSTRONG, M.A., Ph.D., F.R.S.C., President, University of Alberta, Calgary.

REVEREND EDMUND JABEZ THOMPSON, M.A., B.D., Ph.D., D.D., Principal of St. Stephen's College.

REVEREND J. WILFRED DORE, C.S.B., M.A., Ph.D., Rector of St. Joseph's College.

The Rector of St. Aidan's College.

TIMOTHY CLARKE BYRNE, M.A., Ed.D., Chief Superintendent of Schools.

FREDERICK C. JORGENSON, B.Ed., Principal, Southern Alberta Institute of Technology.

REVEREND WILLIAM JOHN COLLETT, B.A., B.Ed., B.D., M.A., Principal, Mount Royal Junior College.

DONALD RUSSELL STANLEY, B.Sc., D.Sc., President of the Alumni Association.

JOHN EDWARD BRADLEY, M.D., Vic-President of the Alumni Association.

AYLMER ARTHUR RYAN, M.A., Provost, University of Alberta, Edmonton.

FRED TERENTIUK, B.Sc., M.A., Ph.D., Provost, University of Alberta, Calgary.

FRANCIS SAVILLE, B.A., President of the Students' Union, Edmonton.

RUSSELL L. McKINNON, President of the Students' Union, Calgary.

TERENCE MICHAEL PENELHUM, M.A., B.Phil., Representative of the Deans' Council, Calgary, to retire, June, 1966.

DOUGLAS ELSTOW SMITH, M.A., Ph.D., representative of the Deans' Council, Edmonton, to retire June 1, 1966.

ERIC JOHN K. PENIKETT, M.B., B.S., Ph.D., M.R.C.S., representative of the General Faculty Council, Edmonton, to retire June 1, 1966.

DONALD MURRAY ROSS, M.A., Ph.D., representative of the General Faculty Council, Edmonton, to retire June 1, 1966.

JOSEPH GOWANLOCH WOODSWORTH, B.A., B.Ed., Ed.D., representative of the General Faculty Council, Calgary, to retire June 1, 1966.

THEOPHILUS GEORGE FINN, B.A., A.M., Ed.D., representative of the General Faculty Council, Calgary, to retire June 1, 1966.

DARROCH DUNCAN CAMPBELL, B.Com., B.A., M.A., Director of Extension.

Appointed Members to Retire November 1, 1966

GRANT M. CARLYLE, Calgary, representing Agriculture.
M. W. HOWEY, B.A., LL.B., Grande Prairie, representing Business.
FRANK BODIE, Calgary, representing Labor.
STANLEY H. McCUAIG, Q.C., Edmonton, representing Industry.
ANNE CARMICHAEL, Edmonton, representing Public Education.
WARD A. STECKLE, Calgary, representing Public Education.
PETER BARGEN, B.A., M.A., Ph.D., Edmonton, representing Public Education.
JAMES BENTLEY, B.Com., Edmonton, representing Agriculture.
MRS. J. D. MANNING, Edmonton, representing organizations devoted to Social and Cultural Welfare.

Secretary

ALEXANDER DUNCAN CAIRNS, B.A., Edmonton, Registrar of the University.

The Senate of the University consists of the Chancellor, the President of the University, the Chairman of the Board of Governors, the President of the University of Alberta, Calgary, the Principal of St. Stephen's College, the Rector of St. Joseph's College, the Rector of St. Aidan's College, the Chief Superintendent of Schools, the Principal of the Southern Alberta Institute of Technology and Art, the Principal of Mount Royal Junior College, the President and Vice-President of the Alumni Association, the Provost of the University at Edmonton, the Provost of the University of Alberta at Calgary, the President of the Students' Union at Edmonton, the President of the Students' Union at Calgary, a representtative of each Deans' Council, two representatives of each General Faculty Council, the Director of the Department of Extension, and nine members selected by the foregoing to represent agriculture, business, labour, industry, public education, and organizations devoted to social and cultural welfare.

Under the University Act of 1942, more emphasis is placed upon the function of the Senate as a bridge between the University and the life and activities of the Province, and less upon academic duties. It is empowered to inquire into all matters that might tend to enhance the usefulness of the University. It is still responsible for recommending to Convocation the conferring of honorary degrees, this being a matter of public interest, but degrees in course are now recommended by the General Faculty Council. The Senate also continues to legislate with respect to student government, but the day-to-day administration of discipline rests with the Deans' Council.

CONVOCATION

Convocation consists (a) of the surviving members of the original group of 346 who registered under the original University Act of 1906, together with all such persons who have been admitted *ad eundem gradum* in the University of Alberta and have become duly registered; and (b) of all graduates of the University of Alberta.

Convocation elects the Chancellor and is authorized, if fifteen of its members by writing demand a meeting, to require the Chancellor to convoke the same, but such a meeting must be for a specific subject duly set forth in a letter of demand and no other subject may be discussed at the meeting.

The Chancellor is the chairman of Convocation.

THE CO-ORDINATING COUNCIL

Unless otherwise provided by the Board of Governors, the Council is composed of the President of the University, the President of the University at Calgary, the vice-presidents, the deans of all faculties and two persons nominated by the General Faculty Council, Calgary.

Its functions are to recommend to the Board the affiliation, or the dissolution or modification of affiliation, of institutions of learning within the Province; to arrange for the conducting of examinations for entry to various professions and for assessment of the qualifications of persons apply for entry to these professions; to consider programs of graduate studies and make recommendations on these to either or both of the General Faculty Councils; to consider academic matters in which the co-operation of both General Faculty Councils would be desirable, and make recommendations on these to either or both of these Councils.

The Chairman is President Johns and the Secretary Associate Professor Samuel.

THE UNIVERSITY, EDMONTON

Councils, Administration and Academic Staff

THE PRESIDENT

WALTER HUGH JOHNS, B.A., Ph.D., LL.D., D.-ès-L.

The President is *ex officio* a member of the Board of Governors, of the Senate, and of all Faculty Councils. He presides in General Faculty Council and in other Faculty Councils when he is present. He is entrusted with the general supervision of the academic work of the University at Edmonton and of the teaching staff and of the administrative staff concerned with academic work. He makes recommendations to the Board of Governors in respect of all appointments to the teaching staff and to the administrative staff of the University at Edmonton who are concerned with academic work and in respect of all promotions and removals of such members of the staff.

THE DEANS' COUNCIL

The Deans' Council, consisting of the President and the Deans of all the Faculties, has advisory, executive, and disciplinary functions. It also acts as the executive body of General Faculty Council.

GENERAL FACULTY COUNCIL

President Johns

Vice-President Wyman

Deans—Bentley, Bowker, Coutts, Hardy, Harries, Huston, McCalla, MacKenzie, MacLean, Smith, Van Vliet

Professors—C. C. Anderson, W. S. Anderson, Andrews, Baldwin, Berg, von Bertalanffy, Bhatia, Black, Blackley, Blackmore, Blench, Bowland, Brodie, R. K. Brown, Buxton, Castaldi, Clandinin, Clegg, Collier, Colter, Cormack, Corns, Daniel, Davy, Downey, Duggan, Dulmage, Dunlop, Eaton, Elder, Empey, Fee, Flock, Folinsbee, Ford, R. S. Fraser, Gads, Gain, Gainer, Gilbert, Gilles, Glyde, Greene, Greenhill, Gunning, Hanson, Harris, Harrison, Hirabayashi, Hocking, Hospers, Howell, Johnson, Kreisel, Leeson, Leja, Lemieux, Lilge, Livingston, Longworth, Lorch, Love, R. S. McArthur, Macbeth, McElroy, J. W. Macgregor, MacHardy, McMurchy, McNamee, Mandel, Manning, Mardiros, Martin, Moser, Mowat, Myers, Nash, Newbound, Nursall, Patching, Paterson, Paul, Pearce, Penikett, Person, Porteous, Quon, Rayback, Reeves, Riedel, Robblee, Robinson, Ross, Royce, Ryan, Salt, Schiff D. B. Scott, Sinclair, A. Smith, W. D. Smith, Sparby, Spencer, Stelck, Stuart, Thomas, A. R. Thompson, Toogood, Tuba, B. E. Walker, G. B. Walker, Weijer, Whyte, Wislon, Wonders, Worth, Yonge, Zalik, Ziel

Associate Professors—Hough, Saffel

Miss McClure, *Director of the School of Nursing*

D. D. Campbell, *Director of Extension*

B. B. Peel, *Librarian*

D. F. Cameron, *Assistant Dean of Medicine*

R. B. Wishart, *Administrator of Student Awards*

A. D. Cairns, *Registrar, Secretary of the Council*

Faculty Councils

The General Faculty Council consists of the President, the Deans, the full Professors in all faculties, the Director of Extension, the Librarian, and the Registrar. The General Faculty Council, subject to the authority of the Board of Governors, is the senior academic body of the University at Edmonton. It arranges timetables, approves courses and examination results, recommends degrees, and hears appeals by students and others from decisions of Faculty Councils.

Each faculty has a Council consisting of the President, the Dean of the Faculty, the professors and associate professors, such other members of the teaching staff of the faculty as the Board of Governors may determine, and a representative of each of the appropriate professional societies associated with the University. Each Faculty Council, subject to the authority of the General Faculty Council, arranges the courses of study falling within its jurisdiction; it arranges for the setting of examinations and for making examination returns to the General Faculty Council. It deals with petitions and memorials from students registered in the Faculty. The membership of these Councils and of the Councils of the Schools of Dental Hygiene, Household Economics, Nursing and Rehabilitation Medicine, is set out below.

Agriculture

President Johns

Dean Bentley

Professors—Berg, Bowland, Clandinin, Clegg, Corns, Elder, Harris, Henry, Hocking, Johnson, Keeping, Love, McElroy, MacHardy, Manning, Person, Robblee, Spencer, Toogood, Weijer, Whyte, Zalik

Associate Professors—Andrew, Ball, Cook, de Man, Evans, Ferrate, Jacka, Knowles, Lesins, Mackie, Pawluk, Preston, J. A. Robertson, W. E. Smith, Skoropad, Stephanson, Webster, Winter, Wood

Dr. J. G. O'Donoghue

Mr. W. E. Bowser representing the Alberta Institute of Agrologists

Dr. J. Gordon Anderson, representing the Veterinary Medical Association of Alberta

The Registrar

Arts

President Johns

Dean Smith

Assistant Deans— R. Motut, W. A. S. Smith

Professors—Baldwin, Blackley, Davy, Dunlop, Eaton, Elder, Gainer, Glyde, Greene, Hanson, Hirabayashi, Kreisel, R. S. MacArthur, Mandel, Mardiros, Royce, Ryan, Thomas

Associate Professors—Archer, Bauer, Berg, Bilsland, Bociurkiw, Brant, Buck, Bueckert, Crighton, Dawson, Faucher, Ferrate, Forrest, Godfrey, Goundrey, Hertzmann, Hobart, Hough, Kalbach, Klawe, Konczacki, Laycock, Longley, J. MacDonald, M. W. Mackenzie, May, McMaster, Moore, Moravcik, Mowatt, Nettler, Peacock, Pilkington, Powrie, Rayback, Reinhold, Rempel, H. S. Robertson, Rolston, Rose, Rothrock, Rozeboom, Runquist, Samuel, A. P. Scott, P. J.

Smith, Sowton, Spearman, Stangeland, Starchuk, J. B. Taylor, S. Taylor, Tennessen, L. H. Thomas, Thomson, Watson, A. G. White, Wilson, Winch, Yates
The Registrar

Commerce

President Johns
Dean Harries
Professors—W. D. Gainer, E. J. Hanson, A. R. Thompson
Associate Professors—G. R. Feiwel, T. Fostvedt, D. Goodale, Goundrey, C. A. Lee, L. C. Leitch, Pinola, B. Rollins, A. O. Saffel
Assistant Professors—W. B. Crowston, Dulat, G. A. Feltham, J. D. Kyle, R. W. Losie
Representative of the Institute of Chartered Accountants of Alberta: Mr. Eric Geddes
The Registrar

Dentistry and Dental Hygiene

President Johns
Deans—MacLean, MacKenzie
Professors—Blackmore, Castaldi, Fee, J. MacGregor, McMurchy, Salt, Tuba
Associate Professors—Davidson, Geldart, Gibb, Haryett, Höhn, D. MacGregor, McPhail, Stewart, Van Alstine
Margaret H. Berry, Director, School of Dental Hygiene
Dr. J. D. M. Alton
Dr. G. E. Decker, representative of the Alberta Dental Association
The Registrar

Education

President Johns
Dean Coutts
Dean Baker
Assistant Dean Pilkington
Professors—Anderson C., Andrews, Black, Buxton, Davy, Downey, Dunlop, Gilles, MacArthur, Mardiros, Mowat, Newbound, Reeves, Sparby, Van Vliet, Walker, Woodsworth, Worth, Ziel
Associate Professors—A. F. Affleck, M. A. Affleck, R. D. Armstrong, M. Ayers, Berry, Cameron, Card, Cheal, Christensen, Dannenmaier, Diemert, Dockrell, Duggan, Earl, Eastwood, Enns, Erickson, Farmer, Forbes, Fraser, Fritz, Godfrey, Godwin, Gulutzan, Hampson, Harper, Hunka, Jenkinson, F. J. Kelly, Kennedy, E. M. King, Knill, Lampard, Longley, Lupul, Macdonald, Melsness, Miklos, Moore, Nay, L. D. Nelson, Newton, Peacock, Purvis, Reese, Rempel, A. Smith, Thomson, Tichenor
Assistant Professors—Filipkowski, M. Smith
Dr. S. C. T. Clarke, representative of the Alberta Teachers' Association
The Principal of the Demonstration School
The Registrar

Engineering

President Johns
Dean Hardy
Associate Dean Gads

Professors—Blench, Folinsbee, Flock, Ford, Gunning, Hanson, Kreisel, Leja, Lilge, Longworth, McNamee, Patching, Porteous, Quon, Robinson, D. B. Scott, Sinclair, G. B. Walker

Associate Professors—Anderson, Bakker, Bauer, Bigg, Bouthillier, E. W. Brooker, Davis, Dalla Lana, Dranchuk, Fowler, Haddow, Israel, Kelly, Kennedy, Kingma, Lilleleht, Lock, McArthur, MacGregor, Murray, Nader, Nuttall, Otto, Panar, Peterson, Phillips, Preston, Ritter, Rodkiewicz, Sadler, Simmonds, Stilwell, Thomson, Verschuren, Voss, Vozoff, Warwaruk, Youdelis

Assistant Professor—Krouse

Mr. H. L. Bouey, representative of the Alberta Association of Architects

Mr. E. K. Lewis, representative of the Association of the Professional Engineers of Alberta

Mr. J. H. Holloway, representative of the Alberta Land Surveyors' Association

The Registrar

Graduate Studies

President Johns

Deans—McCalla, Huston

Associate Dean—Hanson

Assistant Dean—Fostvedt

Professors—Brodie, Challice, Clegg, Colter, Corns, Downey, Dunlop, Ford, Greene, Gunning, Harrison, Hocking, Kreisel, McElroy, Pearce, Person, Reeves, Robinson, Ross, Royce, Schiff, Sinclair, W. D. Smith, Stelck, Toogood, Walker, Wonders, Woodsworth, Worth

The Registrar

Household Economics

President Johns

The Dean, Faculty of Science

Professor—Empey (Director)

Associate Professors—Allen, Duggan, Renner

Assistant Professor—Townsend

The Registrar

Law

President Johns

Dean Bowker

Honorary Professors—Cairns, Ford, Steer, Martland

Professors—Smith, Thompson

Associate Professors—Angus, Head, Sherbaniuk

Assistant Professor—Anderson

C. W. Clement, Q.C., representative of the Law Society of Alberta

The Registrar

Medicine

President Johns

Dean MacKenzie

Dean MacLean

Dean Huston

Assistant Dean Cameron

Professors—W. S. Anderson, Collier, Colter, Daniel, H. E. Duggan, Fowler, Fraser, Gain, Gilbert, Greenhill, Harrison, Leeson, Macbeth, Macgregor, Martin,

Nash, Paterson, Paul, Pearce, Penikett, Salt, Spencer, Stuart, Wilson, Yonge

Associate Professors—Bain, Bell, Bertram, Bowen, Boyd, Carmichael, Chapman, Cottle, Couves, J. W. Duggan, Fish, Forster, Goodwin, Hampton, Hanson, Heath, Henderson, Höhn, Howarth, Kasper, Kay, Kowalewski, B. G. Lane, Laurenson, Lakey, McClure, McLeod, Mahon, Madsen, Marks, Monckton, Nelson, Paterson, Payne, Schonbaum, Shnitka, Smillie, Stewart, R. J. Swallow, W. C. Taylor, Triantaphyllopoulos, Whiting

Dr. W. Bramley-Moore, representative of the College of Physicians and Surgeons of Alberta

The Registrar

Nursing

President Johns

Director—Miss McClure

Dean MacKenzie

Dean Smith

Professor—Paul

Associate Professors—Campbell, Duggan

The Representative of the Alberta Association of Registered Nurses

Representatives of the School of Nursing, University of Alberta Hospital: Miss M. G. Purcell, Director of Nursing, Honorary Lecturer, Miss M. R. Thompson, Associate Director of Nursing Education

The Registrar

Pharmacy

President Johns

Dean Huston

Dean MacKenzie

Professors—Brodie, Collier, Myers, Riedel

Associate Professors—Anderson, Chatten, Morrison, Palmer

W. W. Maday, representative of the Alberta Pharmaceutical Association

The Registrar

Physical Education

President Johns

Dean M. L. Van Vliet

Deans—Coutts, Bentley

Professors—Fraser, Howell, Porteous, W. D. Smith, Goodwin

Associate Professors—Affleck, Anderson, Austin, Eriksson, McLachlin, Mendryk, M. F. R. Smith

Assistant Professors—Carson, Dewar, Drake, Duquette, Elliott, Fracas, Macintosh, Macnab, Morford, Reichenbach, B. J. Sproule

The Registrar

Rehabilitation Medicine

President Johns

Director—M. T. F. Carpendale

Professors—D. Cameron, Macgregor, Mackenzie, Nursall

Associate Professors—Heath, Monckton, Lolita Wilson

Assistant Professors—Allbon, Bradshaw, Orrell

Dr. G. L. Wilson, Dr. R. J. Johnston, Dr. W. Forster

The Registrar

Science

President Johns

The Dean

Professors—von Bertalanffy, Bhatia, Bowland, Brodie, Brown, Collier, Cormack, Downey, Dulmage, Empey, Folinsbee, Ford, Gainer, Gunning, Harris, Hospers, Leeson, Lemieux, Livingston, Lorch, J. W. Macgregor, McNamee, Moser, Myers, L. D. Nelson, Newbound, Nursall, Person, Ross, Royce, Sandin, Schiff, Scott, Stelck, Weijer, Whyte, Wonders

Associate Professors—Allen A. J. Anderson, Ayer, Baadsgaard, G. E. Ball, Berg, Bergmann, Betts, Bigelow, Bilsland, Birss, Bruce, Burwash, F. A. Campbell, J. N. Campbell, Charlesworth, Crawford, Cree, Crosby, Cumming, Darwish, Davis, W. K. Dawson, Duggan, Dunford, Fostvedt, Freeman, Fuller, Graham, Harris, Heath, Hickman, J. C. Holmes, Howarth, Israel, Jacka, Julius, Kalbach, Kebarle, Kennedy, Kuspira, Laycock, Lerbekmo, Lesins, Lewin, Livingston, Longley, Lowig, McClure, J. R. McGregor, McPhail, Mackie, Madsen, Manchester, Narayana, Neilson, T. M. Nelson, O'Brien, Paranjape, Phibbs, Pounder, Rao, Reed, Runquist, Ruth, Saffel, Sample, Sanders, Sharma, K. W. Smillie, L. B. Smillie, W. E. Smith, Starchuk, Taylor, Vozoff, Walker, Weichman, Whitney, Whyte, Woods

Assistant Professor—MacNab

The Registrar

ADMINISTRATIVE OFFICERS

President of the University—Walter Hugh Johns, B.A., Ph.D., LL.D., D.-ès-L.

Vice-President (Academic)—Max Wyman, B.Sc., Ph.D., F.R.S.C.

Provost and Executive Assistant to the President—Aylmer Arthur Ryan, B.A., M.A.

Executive Assistant to the Vice-President—Bernard Edward Riedel, M.Sc., Ph.D.

Assistants to the President—Harold Richard Hawes, B.Sc. and Brian Hugh McDonald, B.Com., M.B.A.

Dean of the Faculty of Arts—Douglas Elstow Smith, M.A., Ph.D.

Assistant Deans—Roger George Motut, B.A., M.A., B.Ed. and Walter Alvah Samuel Smith, B.A., M.A., Ph.D.

Secretary of the Faculty—James William Fishbourne, B.Com.

Dean of the Faculty of Science—

Associate Dean—Kenneth Bateman Newbound, M.Sc., Ph.D.

Assistant Dean—Reginald Charles Jacka, B.Sc., S.M.

Dean of the Faculty of Law—Wilbur Fee Bowker, Q.C., B.A., LL.B., LL.M.

Dean of the Faculty of Engineering—Robert Macdonald Hardy, B.Sc., M.Sc., D.Sc., F.R.S.C., D.L.S., A.L.S.

Associate Dean—Leonard Eustace Gads, B.Sc.

Dean of the Faculty of Medicine—Walter Campbell MacKenzie, B.Sc., M.D., C.M., M.S., F.A.C.S., F.R.C.S.(C.).

Assistant Dean—Donald Forbes Cameron, M.B.E., B.A., M.D.

Dean of the Faculty of Agriculture—Charles Fred Bentley, M.Sc., Ph.D.

Dean of the Faculty of Education—Herbert Thomas Coutts, B.A., M.A., Ph.D.

Assistant Dean—Wilfred Pilkington, M.A., B.Ed.

Dean of the Faculty of Dentistry—Hector Robert MacLean, D.D.S., F.A.C.D., F.I.C.D.

Assistant to the Dean—Clarence W. B. McPhail, B.Sc., D.D.S., M.S.D., F.I.C.D.

Dean of the Faculty of Pharmacy—Mervyn James Huston, M.Sc., Ph.D.

Dean of the Faculty of Graduate Studies—Arthur Gilbert McCalla, B.Sc., M.Sc., Ph.D., F.R.S.C., F.A.I.C.

Associate Dean—Eric John Hanson, B.A., M.A., Ph.D.

Assistant Dean—Thorleif Fostvedt, B.Sc., S.M.

Dean of the Faculty of Commerce—Hubert William Harries, B.Sc., M.Sc., M.A., Ph.D.

Dean of the Faculty of Physical Education—Maurice Lewis Van Vliet, B.S., M.S., Ed.D.

Director of the School of Nursing—Ruth Elizabeth McClure, B.Sc., M.P.H., R.N.

Director of the School of Household Economics—Elizabeth Louise Empey, B.Sc., M.N.S., Ph.D.

Director of the School of Rehabilitation Medicine—Michael Trevor Falls Carpendale, M.R.C.S., L.R.C.P.

Director of the School of Dental Hygiene—Margaret Helen-Marie Berry, B.Sc.

Director of Extension—Darroch Duncan Campbell, B.Com., B.A., M.A.

Assistant Director of Extension—Glen Allenby Eyford, B.A., M.A.

Director of the Summer Session and of the Evening Credit Program—John William Gilles, M.A., M.Ed., Ed.D.

Director of Student Counselling Services—Arthur John Bates Hough, M.A., L.Th.

Counsellors—Peter P. Rempel, B.A., B.Ed., Ph.D., Allen Richard Vander Well, M.A., Leslie Dianne Dale, B.A., Mrs. Rosalyn Delehanty, B.A., D.C.Fair., B.Ed., M.A., Ph.D.

Dean of Women—Mrs. J. Grant Sparling, B.A., Dip.S.W.

Librarian to the University—Bruce Braden Peel, M.A., B.L.S.

Registrar of the University—Alexander Duncan Cairns, B.A.

Associate Registrar—Lynn Parkes Morgan, B.A.

Assistant Registrar—William Alexander Douglas Burns, B.A.

Alumni Secretary—Alexander Gilmour Markle, B.A., B.J.

Bursar of the University—John MacLean Whidden, B.Com.

Chief Accountant—Murray Alexander Rousell, B.Com., C.A.

Purchasing Agent—Edward Frederick Hunter, B.Com.

Accountants—Albert Stephen Knowler, B.Com., Delmar Perry Brooks, B.Com., C.A.

Director of Student Health Services—James Frank Elliott, B.A., M.D., F.R.C.P.(C.), F.A.C.P.

Warden of Athabasca Hall—
Warden of Pembina Hall—Ruth O. F. Bradshaw, Dip.P.T., B.Sc.
Director of Food Services—Joel Stoneham, B.H.E., M.N.H.
Dietitian, Cafeteria—Eleanor Grace Cairns, B.Sc.
Dietitian, Residences—Margaret Gibbard, B.Sc.
Assistant Dietitian, Residences—Venita Semchischen, B.Sc.
Personnel Officer—Murray Stewart Cooke, B.S.A.
Superintendent of Buildings—Ronald Edward Phillips, B.Sc.
Superintendent of Grounds—Robert Hugh Knowles, B.S.A., M.Sc.
Campus Development Officer—J. R. B. Jones, D.S.O., O.B.E., C.D., B.Sc.
Administrator of Student Awards—Robert Barry Wishart, B.Com.
Dean of Men—Roland Charles Wilkins Hooper, Major, Dip.R.M.C., p.s.c.
Co-ordinator of Technical Services—R. D. Cooke
Director of Housing—George M. Tauzer, B.Sc.

ACADEMIC STAFF

INSTRUCTIONAL AND ADMINISTRATIVE)

Compiled June 1964

(The first of the dates in each case is that of first appointment, and the second that of attaining the present rank.)

AARON, Theodore Herschel, BSc MD (Alberta), Instructor in Medicine (1952, 1952).

ABRAHAMSSON, Kurt-Viking, Fil Lic (Helsinki), Assistant Professor of Georgraphy (1963, 1963).

ADAMS, Peter Frederick Gordon, BEng (Nova Scotia Tech. College), Assistant Professor of Civil Engineering (1960, 1960).

ADAMS, William Sanderson, MSc (Alberta), Assistant Professor of Computing Science (1962, 1962).

AFFLECK, Alan Ferguson, BPHE (Toronto), BEd (Alberta), Associate Professor of Physical Education (1951, 1962).

AFFLECK, Muriel Adeline, MEd (Alberta), Associate Professor of Elementary Education (1949, 1957).

ALLARD, Charles Alexander, MD (Alberta), FRCS(C) FACS, Lecturer in Surgery (1951, 1958).

ALLBON, Leonard George, Teaching Diploma AOT (London), Assistant Professor of Occupational Therapy (1960, 1961).

ALLEN, Willard Finlay, BSc (W. Ontario), MA PhD (Toronto), Associate Professor of Chemistry (1948, 1954).

ALLIN, Eardley Samuel, BSc (Alberta), MD (Toronto), FRCS (London), FRCS(C), Instructor in Surgery (1941, 1947).

ALLIN, George Edgar, BSc MD (Alberta), FRCS (England), Sessional Instructor in Surgery (1960, 1960).

ALTMANN, Stuart Allen, MA (California), PhD (Harvard), Assistant Professor of Zoology (1960, 1960).

ALTON, John Douglas McGregor, MSc MD (Alberta), Lecturer in Surgery (1959, 1964).

ANDERSON, Arthur James, BSc (Alberta), MS PhD (Washington), Associate Professor of Pharmacy (1949, 1957).

ANDERSON, Charles Campbell, MA EdB (Glasgow), PhD (Cambridge), Professor of Educational Psychology (1957, 1963).

ANDERSON, Kenneth Owen, BSc (Alberta), Associate Professor of Civil Engineering (1957, 1962).

ANDERSON, Roland Frank, BA (British Columbia), MA (Wisconsin), PhD (Toronto), Assistant Professor of English (1961, 1961).

ANDERSON, Miss Ruby Olga, MEd (Alberta), Associate Professor of Physical Education (1956, 1961).

ANDERSON, Walter Stirling, BSc (Alberta), MS MD (Toronto), FRCS(C) FACS, Professor of Surgery (1941, 1956).

ANDREW, William Treleaven, BSc (Alberta), MS (Utah State), PhD (Michigan), Associate Professor of Horticulture (1959, 1959).

ANDREWS, John Hobart Maclean, MA (British Columbia), PhD (Chicago), Professor of Educational Administration (1957, 1961)

ANGUS, William Herbert, BA LLB (Toronto), LLM (Columbia), Associate Professor of Law (1959, 1964).

ARAI, Mary N., BSc (New Brunswick), MA (Toronto), PhD (California), Research Asociate of Biology (1963, 1964).

ARCHER, Miss Violet, BMus (McGill), BMus MMus (Yale), Associate Professor of Music (1962, 1962).

ARMSTRONG, Heman Brock, MD (Alberta), Assistant Clinical Professor of Paediatrics (1950, 1959).

ARMSTRONG, Robert David, BEd BA MEd (Alberta), Associate Professor of Elementary Education (1962, 1964).

ARMSTRONG, William Sloane Seale, MD CM (McGill), Assistant Clinical Professor of Otolaryngology (1931, 1955).

ASMYTE, Ieva, BA (Luther, Iowa), MA (Syracuse), PhD (N. Carolina), Assistant Professor of German (1964, 1964).

AUSTIN, Miss Patricia Louise, BPHE (Toronto), MA (Columbia), Associate Professor of Physical Education (1947, 1955).

AUXIER, Miss Margaret Virginia, BA (Alberta), BA in Lib (Washington), Reference Librarian (1961, 1963).

AYER, William Alfred, BSc PhD (New Brunswick), FCIC, Associate Professor of Chemistry (1958, 1963).

AYERS, John Douglas, BA BEd (British Columbia), PhD (Toronto), Associate Professor of Educational Psychology (1959, 1959).

BAADSGAARD, Halfdan, BS (Minnesota), PhD (Federal Inst., Zurich), Associate Professor of Geology (1957, 1961).

BADUN, Walter Robert, BScEng (Alberta), MBA (W. Ontario), Assistant Professor of Commerce (1963, 1963).

BAIN, Gordon Orville, BSc MD (Alberta), Associate Professor of Pathology (1952, 1960).

BAIRD, Richard Edward, BA (Augustana), MA PhD (Illinois), Assistant Professor of Political Science (1960, 1960).

BAKKER, Jaap Jelle, BSc (Glasgow), MSCE (Purdue), Associate Professor of Civil Engineering (1959, 1962).

BALDWIN, Robert George, BA (British Columbia), MA PhD (Toronto), Professor of English (1951, 1963).

BALL, George Eugene, AB PhD (Cornell), MS (Alabama), Associate Professor of Entomology (1954, 1959).

BALLAH, Allan J., BEd MA (Alberta), Lecturer in French (1964, 1964).

BANCROFT, Donald Asa, BSc MA (Alberta), Associate Professor in Department of Extension (1958, 1963).

BARAGAR, Francis Alvin, MSc (Manitoba), PhD (Brandeis), Assistant Professor of Mathematics (1962, 1962).

BARON, Mark John, BSc (Alberta), MS (Illinois), Assistant Professor of Civil Engineering (1959, 1959).

BARR, James Stevenson, MB ChB (Glasgow), MRCOG FRCS(C), Instructor in Obstetrics and Gynaecology (1958, 1963).

BARRY, Douglas Dennis, AOCA (Ontario College of Art), Extension Assistant Professor of Art (1960, 1963).

BASARABA, Neil, DDS (Alberta), Lecturer in Dentistry (1958, 1958).

BAUER, Milton Frank, BA (W. Ontario), MA (Toronto), Associate Professor of Economics (1956, 1964).

BEATTY, David Delmar, BA (West Washington State College), MS (Wyoming), Assistant Professor of Zoology (1964, 1964).

BEAUCHAMP, Louis Emile, MSc MD (Alberta), Lecturer in Paediatrics (1951, 1955).

BEDNARSKI, Mrs. Hanna Jadwiga, MPhil (Warsaw), BLS (McGill), Library Assistant (1962, 1962).

BEISSEL, Henry Eric, MA (Toronto), Lecturer in English (1962, 1962).

BELL, David MacPherson, BA MD (Alberta), Instructor in Medicine (1953, 1953).

BELL, Donald Munns, MD (Alberta), FRCS(C) FACS, Lecturer in Obsteterics and Gynaecology (1951, 1955).

BELL, Gordon Irving, BA MD (Alberta), FACP, Lecturer in Medicine (1945, 1950).

BELL, Harold Edwin, BSc MD (Alberta), Assistant Professor of Pathology and Sessional Instructor in Biochemistry (1957, 1964).

BELL, Robert Edward, MD (Alberta), Associate Professor of Pathology and Honorary Lecturer in Medicine (1950, 1962).

BELLOW, Donald Grant, BASc (Brit. Columbia), MSc PhD (Alberta), Assistant Professor of Mechanical Engineering (1963, 1963).

BENTLEY, Charles Fred, MSc (Alberta), PhD (Minnesota), Professor of Soil Science and Dean of Agriculture (1946, 1959).

BERCOV, Ronald, MSc (Alberta), PhD (California IT), Assistant Professor of Mathematics (1963, 1963).

BERG, Eric Richard, MA (Texas), MS PhD (Illinois), Associate Professor of Economics (1962, 1962).

BERG, Roy Torgny, BSc (Alberta), MS PhD (Minnesota), Professor of Animal Genetics (1950, 1963).

BERGMANN, John Francis, AB PhD (California), MA (Texas), Associate Professor of Geography (1960, 1963).

BERRY, Gerald Lloyd, BEd MA (Alberta), PhD (Colorado), Associate Professor of Secondary Education (1961, 1961).

BERRY, Miss Margaret Helen-Marie, BSc (Mount Allison and Columbia), Assistant Professor and Director, School of Dental Hygiene (1961, 1961).

von BERTALANFFY, Ludwig, PhD (Vienna), Professor of Theoretical Biology (1961, 1962).

BERTRAM, Ewart G., BA MSc (W. Ontario), PhD (Buffalo), Associate Professor of Anatomy (1961, 1961).

BERTRAM, Sheila, BSc (McMaster), BLS (Toronto), Library Assistant (1964, 1964).

BESNEY, Morris, BSc MD (Alberta), Instructor in Surgery (1958, 1959).

BESSAI, Mrs. Diane Elizabeth, BA (W. Ontario), MA (London), Assistant Professor of English (1961, 1961).

BESSAI, Frank, MA (Saskatchewan), PhD (Toronto), Assistant Professor of English (1960, 1960).

BEST, Miss Barbara Jane, BSc (Carleton), Instructor in Clinical Pathology (1956, 1956).

BETTS, Donald Drysdale, MSc (Dalhousie), PhD (McGill), Associate Professor of Physics (1956, 1961).

BHATIA, Avadh Behari, MSc DPhil (Allahabad), PhD (Liverpool), FRSC, Professor of Physics (1955, 1960).

BIGELOW, Charles Cross, BASc (Toronto), MSc PhD (McMaster), Associate Professor of Chemistry (1962, 1964).

BIGG, Walter Lionel, BSc (Alberta), Associate Professor of Civil Engineering (1957, 1960).

BILSLAND, John Winstanley, MA (British Columbia), PhD (Toronto), Associate Professor of English and Assistant Dean of Arts and Science (1955, 1963).

BIRSS, Fraser William, MA (Saskatchewan), DPhil (Oxford), Associate Professor of Chemistry (1959, 1963).

BLACK, Donald Burrows, BEd (Alberta), EdD (Washington), Professor of Educational Psychology (1957, 1961).

BLACKLEY, Frank Donald, MA PhD (Toronto), Professor of History (1950, 1959).

BLACKMORE, Robert Valentine, DDS (Alberta), Professor of Operative Dentistry (1948, 1964).

BLAIR, Allan Goudie, BSc (Queen's), MBA (W. Ontario), Assistant Professor of Commerce (1962, 1962).

BLANCHARD, William August, MA (Oregon), Assistant Professor of Psychology (1961, 1961).

BLENCH, Thomas, BSc (Glasgow), DSc (Alberta), MICE, Professor of Civil Engineering (1948, 1954).

BOAG, David Archibald, MSc (Alberta), Assistant Professor of Zoology (1963, 1963).

BOCIURKIW, Bohdan Rostyslaw, MA (Manitoba), PhD (Chicago), Associate Professor of Political Science (1956, 1961).

BOILEAU, George René, BSc MD (Alberta), FRCS(C), Instructor in Surgery (1952, 1952).

BORHEK, James T., AB (Illinois), MA (California), PhD (Oregon), Assistant Professor of Sociology (1962, 1962).

BOSLEY, Richard N., AB (Utah), MA (Berkeley), Lecturer in Philosophy (1964, 1964).

BOUTHILLIER, Patrick Henry, BSc (Alberta), SM (Harvard), Associate Professor of Civil Engineering (1947, 1956).

BOWEN, Peter, MD (Toronto), FRCP(C), Associate Professor of Human Genetics, Department of Paediatrics (1964, 1964).

BOWKER, Wilbur Fee, QC BA LLB (Alberta), LLM (Minnesota), Dean of Law (1945, 1948).

BOWLAND, John Patterson, BSA (Manitoba), MS (Washington), PhD (Wisconsin), Professor of Animal Nutrition (1949, 1962).

BOYD, John Angus, BA (Saskatchewan), MD (Manitoba), FRCS(C) FACOG, Lecturer in Obstetrics and Gynaecology (1954, 1958).

BOYD, Thomas Alexander Somerville, MB ChB (Glasgow), FRCS (England), Associate Professor of Ophthalmology and Director, Division of Ophthalmology, Department of Surgery (1958, 1964).

BRABEN, Donald W., MSc PhD (Liverpool), Assistant Professor of Physics (1962, 1962).

BRADSHAW, Miss Ruth O. F., DipPT (Toronto), TeachDip (Toronto), BSc (PaedOT) (McGill), Assistant Professor and Head, Division of Physical Therapy (1962, 1962).

BRAMLEY-MOORE, William, MD (Alberta), Lecturer in Medicine (1949, 1949).

BRAND, H. M., MB BS (Dunelm), Sessional Instructor, Preventive Medicine (1963, 1963).

BRANT, Charles Sanford, BA (Reed), MA (Yale), PhD (Cornell), Associate Professor of Anthropology (1961, 1963).

BRAUN, Richard E., AM (Michigan), Assistant Professor in Classics (1962, 1964).

BRODIE, Harold Johnson, MSc (Manitoba), PhD (Michigan), Professor and Head of Botany (1957, 1957).

BROOKER, Elmer Whitmore, MSc (Alberta), PhD (Illinois), Associate Professor of Civil Engineering (1958, 1964).

BROOKS, Delmar Perry, BCom (Saskatchewan), CA, Accountant (1961, 1963).

BROSCOE, Andy Joe, BS (Mount Union, Ohio), AM (Oberlin), PhD (Columbia), Assistant Professor of Geology (1964, 1964).

BROWN, Gordon David, BSc MD (Alberta), Insturctor in Medicine (1954, 1954).

BROWN, Leigh Borrodell, BSc MD (Alberta), FRCS(C) ,Instructor in Obstetrics and Gynaecology (1957, 1963).

BROWN, Robert Karl, MSc (Alberta), PhD (McGill), Professor of Chemistry (1946, 1960).

BRUCE, William John, BEd (Alberta), MEd (Chicago), PhD (Washington), Associate Professor of Mathematics (1958, 1959).

BRYAN, Alan Lyle, MA (Washington), PhD (Harvard), Assistant Professor of Anthropology (1963, 1963).

BUCHANAN, Donald Ian, MB ChB (Glasgow), Instructor in Pathology (1955, 1959).

BUCK, Robert John, BA (Alberta), MA (Kentucky), PhD (Cincinnati), Associate Professor and Head of Classics (1960, 1964).

BUECKERT, Frank, BEd (Saskatchewan), AM (Columbia), Associate Professor of Drama 1955, 1964).

BUGIS, Joseph, BA MD (Alberta), Lecturer in Obstetrics and Gynaecology (1954, 1962).

BULMER, Michael Thomas, BA (Sir George Williams), BLS (McGill), Library Assistant (1963, 1963).

BURNS, William Alexander Douglas, BA (Alberta), Assistant Registrar (1960, 1964).

BURSEWICZ, Mrs. Anne Marjory, MB ChB (Edinburgh), DPH (Toronto), Assistant Professor of Bacteriology (1960, 1960).

BURTON, Theodore Allan, MA PhD (Washington State), Assistant Professor of Mathematics (1964, 1964).

BURWASH, Ronald Allan McLean, BEd MSc (Alberta), PhD (Minnesota), Associate Professor of Geology (1956, 1959).

BURY, Robert James, MD (W. Ontario), Assistant Professor of Anatomy (1952, 1958).

BUXTON, Earl William, BA BEd (Alberta), MA Washington), PhD (Stanford), Professor of Secondary Education (1948, 1959).

CAIRNS, Alexander Duncan, BA (Alberta), Registrar (1946, 1956).

CAIRNS, Andrew, MD (Alberta), Lecturer in Medicine (1952, 1964).

CAIRNS, Miss Eleanor Grace, BSc (Alberta), Cafeteria Dietitian (1944, 1944).

CALDER, James, MD (Alberta), Clinical Professor of Paediatrics (1933, 1954).

CALLAGHAN, John Carter, MS MD (Toronto), FRCS(C) FACS, Clinical Professor of Surgery (1955, 1960).

CAMERON, Donald Forbes, MBE BA MD (Alberta), Assistant Professor of Anaesthesia, Assistant Dean, Faculty of Medicine (1950, 1962).

CAMERON, Donald Roy, BA MEd (Alberta), Associate Professor of Educational Psychology (1962, 1962).

CAMERON, Gordon, MD (McGill), Lecturer in Surgary (1955, 1958).

CAMERON, Mrs. Nancy Suzanne, MA BLS (Toronto), Assistant Professor of Anatomy (1964, 1964).

CAMERON, Robert Bruce, DDS LDS (Toronto), Sessional Lecturer in Dental Therapeutics (1946, 1946).

CAMPBELL, Darroch Duncan, BA BCom (British Columbia), MA (Alberta), Professor and Director of Extension (1949, 1956).

CAMPBELL, Donald James, BSc (Alberta), MS PhD (Purdue), Assistant Professor of Medicine (1960, 1963).

CAMPBELL, Finley Alexander, BSc (Manitoba), MA (Queen's), PhD (Princeton), Associate Professor of Geology (1958, 1963).

CAMPBELL, James Nicoll, BA (W. Ontario and British Columbia), MSc (British Columbia), PhD (Chicago), Associate Professor of Microbiology (1960, 1964).

CAMPBELL, Miss Margaret Murray, RN BASc (British Columbia), MPH (Michigan), Associate Professor of Nursing (1957, 1964).

CANTOR, Maxwell Mordecai, BSc MD (Manitoba), FACP, Assistant Clinical Professor of Pathology (1930, 1956).

CARD, Brigham Young, BSc BEd (Alberta), PhD (Stanford), Asociate Professor of Educational Foundatoins (1945, 1955).

CAREY, William Geoffrey, BA (Cantab), Assistant Professor in Russian (1963, 1964).

CARMICHAEL, John William, MSc (Alberta), MA PhD (Harvard), Associate Professor of Bacteriology (1954, 1958).

CARPENDALE, Michael Trevor Falls, MRCP (London), LRCP (England), Assistant Clinical Professor of Rehabilitation Medicine (1956, 1960).

CARSON, Miss Audrey Marie, BEd (Alberta), Assistant Professor of Physical Education 1958, 1959).

CARSON, George Donaldson, MD (Alberta), Instructor in Psychiatry (1954, 1954).

CASTALDI, Cosmo Raymond, DDS (Toronto), MDS (Northwestern), Professor and Head of Pediatric Dentistry (1956, 1961).

CAVELL, Ronald George, BSc (McGill), MSc PhD (British Columbia), Assistant Professor of Chemistry (1964, 1964).

CHAPIN, Donald Frederick, MA (Toronto), Assistant Professor of English (1959, 1959).

CHAPMAN, Kent, BA MS PhD (Minnesota), Associate Professor of Physiology (1958, 1963).

CHARLESWORTH, Henry Alexander Kaye, MA (Cambridge), PhD (Glasgow), Associate Professor of Geology (1956, 1960).

CHATTEN, Leslie George, MSc (Alberta), PhD (Ohio State), Associate Professor of Pharmacy (1961, 1961).

CHENG, Kwo Chang, BS (Cheng-Kung), MS (Kansas State), PhD (Ohio State), Assistant Professor of Mechanical Engineering (1962, 1962).

CHEPEHA, N., BEd MD (Alberta), Sessional Instructor in Preventive Medicine (1963, 1963).

CHRISTENSEN, Clifford Manley, MA PhD (Minnesota), Associate Professor of Educational Psychology (1959, 1959).

CHWE, Byoung-Soung, MS (Seoul), PhD (California), Assistant Professor of Mathematics (1961, 1961).

CLANDFIELD, Frederick, David, BEd MA (Alberta), Assistant Professor of English (1963, 1963).

CLANDININ, Donald Robert, MSA (British Columbia), PhD (Wisconsin), Professor of Poultry Nutrition (1938, 1953).

CLARE, Rupert McConnell, MD (Alberta), Lecturer in Radiology (1946, 1956).

CLARKE, Kenneth Andrew Connal, BSc MD (Alberta), Clinical Professor of Otolaryngology (1950, 1960).

CLARKE, Thomas Roy, MD (Alberta), FRCOG, Clinical Associate Professor of Obstetrics and Gynaecology (1941, 1963).

CLEGG, Lawrence Frank Levey, MSc (Toronto), PhD DSc DIC FI Biol (London), Professor and Head of Dairy Science (1958, 1958).

COLLIER, Herbert Bruce, MA PhD (Toronto), FRSC Professor of Biochemistry (1949, 1949).

COLLINSON, Donald Maurice, DDS (Alberta), Lecturer in Dentistry (1959, 1961).

COLOTELO, Nicholas, BSc (Ontario Agricultural College), MSc PhD (Saskatchewan), Assistant Professor of Plant Science (1962, 1962).

COLTER, Miss Carla Kathleen Alixe, BA (McGill), Assistant Professor of French (1959, 1960).

COLTER, John Sparby, BSc (Alberta), PhD (McGill), Professor and Head of Biochemistry (1961, 1961).

COMBS, Weslie, BS (California State Polytechnic), MS (Minnesota), PhD (Wyoming), Assistant Professor of Animal Genetics (1962, 1962).

CONGER, Miss Patricia Ruth, BSEduc (Florida State), Instructor in Physical Education (1963, 1963).

CONRADI, Gerhard Johann, MD (Jena), Instructor in Paediatrics (1954, 1954).

CONROY, Frederick David, MD (Alberta), Instructor in Surgery (1946, 1946).

COOK, Fred D., MSA (British Columbia), PhD (Edinburgh), Associate Professor of Soil Microbiology (1964, 1964).

COOKE, Murray Stewart, BSA (Saskatchewan), Personnel Officer (1957, 1957).

COOKE, Robert Darwin, Coordinator of Technical Services (1960, 1960).

CORMACK, Eric Wyld, CG OBE BSc (Alberta), Assistant Professor of Extension (1949, 1950).

CORMACK, Robert George Hall, MA PhD (Toronto), FRSC, Professor of Botany (1936, 1957).

CORNS, William George, MSc (Alberta), PhD (Toronto), Professor and Head of Plant Science (1946,1961).

COSSINS, Edwin A., BSc PhD (London), Assistant Professor of Botany (1962, 1962).

COTTLE, Mrs. Merva Kathryn, MA (British Columbia), PhD (Washington), Lecturer in Physiology (1956, 1958).

COTTLE, Walter Henry, MA (British Columbia), PhD (Washington), Associate Professor of Physiology (1956, 1961).

COULSON, William Frederick, BS)Iowa), MS (Minnesota), Assistant Professor of Secondary Education (1960, 1960).

COUTTS, Herbert Thomas, BA (Toronto), MA (Alberta), PhD (Minnesota), Professor and Dean of Education (1946, 1955).

COUVES, Cecil Melville, BA (Saskatchewan), MD (Manitoba), FACS, FRCS (Edinburgh), FRCS(C), Associate Professor of Surgery (1957, 1960).

CRAWFORD, Robert James, MSc (Alberta), PhD (Iillinois), Associate Professor of Chemistry (1956, 1962).

CREE, George Charles, MA (McGill), PhD (Washington, Mo.), Associate Professor of Mathematics (1957, 1959).

CRIGHTON, Arthur Bligh, LRSM LRCT MusBac (Toronto), Asscociate Professor of Music (1949, 1957).

CROOKS, Hugh James, BSc MD (Alberta), Instructor in Obstetrics and Gynaecology (1961, 1963).

CROSBY, Douglas Richard, BSc (Alberta), MA PhD (Princeton), DPhil (Oxford), Associate Professor of Mathematics (1950, 1953).

CROWSTON, Wallace Bruce Stewart, BASc (Toronto), SM (Massachusetts Institute of Technology), Assistant Professor of Commerce (1960, 1960).

CUMMING, George Leslie, MA (Saskatchewan), PhD (Toronto), Associate Professor of Physics (1959, 1962).

DAFOE, Colin Scott, MD CM (Queen's), FRCS (Edinburgh), Instructor in Surgery (1952, 1952).

DALE, Miss Leslie Dianne, BA (Texas Tech. College), Counsellor, Student Counselling Services (1962, 1962).

DALLA LANA, Ivo Giovanni, BASc (British Columbia), MSc (Alberta), PhD (Minnesota), Associate Professor of Chemical Engineering (1957, 1960).

DANIEL, Edwin Embrey, MA (Johns Hopkins), PhD (Utah), Professor and Head of Pharmacology (1961, 1961).

DANNENMAIER, William Deal, BA (Harris Teachers' College, St. Louis), MA (Washington), Associate Professor of Educational Psychology (1963, 1963).

DARDIER, Miss Esme, MCSP (London), Lecturer in Physical and Occupational Therapy (1963, 1963).

DARWICK, Miss Doris, BSEduc (Florida State), Instructor in Physical Education (1963, 1963).

DARWISH, David, BSc (Alberta), PhD (UCLA), Associate Professor of Chemistry (1958, 1963).

DAVEY, Peter William, MD CH (Queen's) Assistant Professor of Pathology (1952, 1958).

DAVIDSON, Gerhard B., DDS (Washington), Associate Professor of Operative Dentistry (1961, 1961).

DAVIDSON, Mrs. Katherine Maud, BSc (Alberta), Lecturer in Dentistry (1963, 1963).

DAVIES, Mrs. Mary Adam, MSW (McGill), Instructor in Psychiatry (1955, 1955).

DAVIS, Ray George, BSc MD (Alberta), MRCPS, Instructor in Surgery (1958, 1958).

DAVIS, Stuart George, MSc (Alberta), PhD (McGill), Associate Professor and Secretary of Chemistry (1942, 1958).

DAVY, Grant Robert, BA (W. Ontario), MA PhD (Fletcher School of Law and Diplomacy), Professor and Head of Political Science (1951, 1964).

DAWSON, Wilfred Kenneth, BASc (Laval), MA PhD (Queen's), Associate Professor of Physics (1959, 1961).

DAWSON, William Foster, BA (Toronto), MA (Queen's), DPhil (Oxford), Associate Professor of Political Science (1958, 1964).

DAY, Frederick George, BSc MD (Alberta), MChOrth (Liverpool), FRFPS (Glasgow), Lecturer in Orthopaedic Surgery (1952, 1960).

DAY, Richard Allen, MD (Toronto), FRCS(C), Instructor in Obstetrics and Gynaecology (1964, 1964).

DEANE, Gordon Alan, DDS (Alberta), Lecturer in Dentistry (1960, 1961).

DE LUNA, Mrs. Barbara Nelsen, BA (Washington), MA PhD (Iowa State), Assistant Professor of English (1963, 1964).

DE LUNA, Frederick A., MA PhD (Iowa State), Assistant Professor of History (1963, 1963).

DE MAN, Johannes Maria, BChemEng (Arnhem), PhD (Alberta), Associate Professor of Dairy Science (1959, 1963).

DELEHANTY, John Jerome, BS (Minnesota), Assistant Professor of Economics (1962, 1962).

DELEHANTY, Mrs. Rosalyn, BA (Minnesota), Counsellor Student Counselling Services (1963, 1963).

DENHAM, Ross Allen, BCom (Alberta), CA Lecturer and Acting Secretary, Faculty of Commerce (1964, 1964).

DENNIS, Miss Thelma Bernice, BSc HEc (Alberta), MS (Pennsylvania State), Assistant Professor of Household Economics (1962, 1963).

DIEMERT, Miss Helen Marie, BA (St. Benedict), MA (Minnesota), Associate Professor of Elementary Education (1959, 1964).

DIETLE, Robert Lee, AB (San Jose State College); MA (UCLA), Assistant Professor of Drama (1964, 1964).

DIXON, Allan Alvin, BSc MD (Alberta), MS (Minnesota), Lecturer in Dermatology (1958, 1958).

DOCKRELL, William Bryan, BA (Manchester), BEd (Edinburgh), Associate Professor of Educational Psychology and Chairman, First Year Committee (1958, 1963).

DODDS, Miss Mary Isobel, BCom (Alberta), MS (Columbia), Extension Librarian (1955, 1956,).

DONALD, Edwad Ferris, MD (Alberta), Lecturer in Medicine (1941, 1950).

DORSEY, Francis Richard James, BSc MD (Alberta), Instructor in Obstetrics and Gynaecology (1954, 1956).

DOUGALL, Robert Henry, BAct (Saskatchewan), BSc MD (Alberta), Lecturer in Medicine (1963, 1964).

DOWNEY, Lawrence William, BA (British Columbia), PhD (Chicago), Professor and Head of Secondary Education (1960, 1962).

DOWNS, William James, BA (Alberta), MD CM (McGill), Instructor in Medicine (1948, 1948).

DRAKE, Clare James, BPE (British Columbia), BEd (Alberta), Assistant Professor of Physical Education (1958, 1960).

DRANCHUK, Peter Michael, BSc (Alberta), Associate Professor of Petroleum Engineering (1953, 1960).

DRUGGE, Sten Erik, BA (British Columbia), Assistant Professor of Economics (1964, 1964).

DUGGAN, Miss Grace Lesley, BSc BEd (Alberta), MS (Chicago), Associate Professor of Household Economics (1931, 1953).

DUGGAN, Hector Ewart, MD (Alberta), FACR, Professor of Radiology (1948, 1959).

DUGGAN, John Winston, MD (Alberta), MMS (Tulane), FRCS(C), FACS, Associate Professor of Ophthalmology (1950, 1960).

DUKE, Charles Gavin, DDS (Alberta), Sessional Lecturer in Prosthetic Dentistry (1948, 1948).

DULAT, Harikirpal Singh, MA LLB (Agra), MBA (Oregon), Assistant Professor of Commerce (1963, 1963).

DULMAGE, Andrew Lloyd, MA PhD (Toronto), Professor and Head of Mathematics (1964, 1964).

DUNCAN, Neil Fraser, BSc MD (Alberta), Assistant Clinical Professor of Paediatrics (1954, 1960).

DUNFORD, Hugh Brian, MSc (Alberta), PhD (McGill), FCIC, Associate Professor of Chemistry (1957, 1961).

DUNLOP, George Murray, BA (Saskatchewan and Alberta), MA (Alberta), PhD (Columbia), Professor and Head of Educational Psychology (1945, 1950).

du PLAN, Mlle. Daniele Billion, LèsL (Lyon), DipdEtSup CAPES, Assistant Professor of French (1962, 1964).

DVORKIN, Joseph, BA MD (Alberta), Assistant Clinical Professor of Medicine (1950, 1959).

EARL, Samuel Aubrey, BSc (Brigham Young), MEd (Montana), Associate Professor of Educational Foundations (1959, 1959).

EASTERBROOK, James Arthur, MA (Queen's), PhD (London), Assistant Professor of Psychiatry, Department of Psychiatry (1961, 1963).

EASTWOOD, Benjamin Joseph, DDS (Alberta), Assistant Professor of Orthodontic Dentistry (1946, 1960).

EASTWOOD, Gordon Ross, BEd BA C Ed A (Western Australia), MA PhD (Minnesota), Associate Professor Educational Foundations (1964, 1964).

EATON, Richard Stephen, LMus MusB (McGill), Professor of Music (1947, 1956).

EDWARDS, Allan Manning, BSc MD (Alberta), FRCP(C), Lecturer in Medicine (1956, 1961).

EDWARDS, Frank John, MD CM (McGill), Instructor in Psychiatry (1959, 1959).

EICK, Ronald Edward, MA (Michigan State), Assistant Professor of Educational Foudations (1962, 1962).

ELDER, Andrew Thomson, BA (Alberta), MA PhD (Toronto), Professor and Secretary of English (1950, 1963).

ELLIOTT, G. M., BSc (London), Specialist Dip (Carnegie College, Leeds), Assistant Professor of Physical Educaton (1963, 1963).

ELLIOTT, James Francis, BA MD (Alberta), FRCP(C), FACP, Director of Student Health Services and Clinical Professor of Medicine (1946, 1953).

ELLIOTT, Mrs. Madeleine Ruth, BSc RN (Alberta), Lecturer in Nursing (1961, 1961).

ELLIS, John Martin, BA (London), Assistant Professor of German (1963, 1963).

ELLIS, Miss Margaret, Dip (Chelsea College), Teach Cert (London University), Instructor in Physical Education (1964, 1964).

ELWOOD, Ralph Carter, BA (Dartmouth), MA (Columbia), Assistant Professor of History (1964, 1964).

EMPEY, Miss Elizabeth Louise, BSc (Alberta), PhD (Cornell), Professor and Director of Household Economics (1947, 1960).

ENGER, Mrs. Donna Kay, BPE (Alberta), Instructor in Physical Education (1961, 1961).

ENGLISH, Miss Moira Latimer, BA (Brit. Columbia), MLS (Washington), Education Librarian (1957, 1957).

ENNS, Frederick, MEd PhD (Alberta), Associate Professor of Educational Administration (1961, 1963).

ERIKSON, Lloyd Bernhardt, BA (Rochester), MA (Oxford), PhD (Illinois), Assistant Professor of Anatomy (1960, 1960).

ERIKSSON, Arthur William Emanuel, BSc (Alberta), MSc (Washington), Associate Professor of Physical Education (1945, 1951).

ESHEL, Abraham, BSc (Israel), MME (Rensselaer Polytechnical Institute), Assistant Professor of Mechanical Engineering (1960, 1960).

EVANS, Brian Llewellyn, BA (Alberta), PhD (London), Assistant Professor of History (1961, 1961).

EVANS, William George, MS PhD (Cornell), Associate Professor of Entomology (1958, 1961).

EYFORD, Glen Allenby, BA (Manitoba), MA (Toronto), Associate Professor and Assistant Director, Department of Extension (1960, 1963).

FAIR, DONALD, Clarence, BEd MA (Alberta), PhD (Minnesota), Counsellor; Student Counselling Services (1957, 1957).

FARMER, Miss Geraldine Mary, BEd (Alberta), MA PhD (Minnesota), Associate Professor of Secondary Education (1960, 1964).

FARNELL, Mrs. Margaret Isabel Hamilton, BA (Alberta), BS in LS (Simmons College, Boston), Library Assistant (1964, 1964).

FAUCHER, Manoel, LenDroit (Paris), MA (California), Associate Professor of French (1947, 1954).

FAULDS, Alexander Gordon, MCSP (London), Assistant Professor of Physiotherapy (1958, 1960).

FEE, Alan Douglas, DDS (Alberta), MSc (Ohio State), Professor and Head of Prosthetic Dentistry (1946, 1962).

FEIWEL, George Richard, BCom MA (McGill), CA, Associate Professor of Commerce (1962, 1962).

FELDHERR, Carl M., BA (Hartwick College, N.Y.), PhD (Pennsylvanie), Assistant Professor of Physiology (1962, 1962).

FELTHAM, Gerald Albert, BCom (Saskatchewan), Assistant Professor of Accounting (1961, 1961).

FENTON, Miss Yvonne, BA (Dunelm), ALA (England), Chief Cataloguer (1954, 1964).

FERGUSON, William Foster, BSc MD (Alberta), Assistant Professor of Obstetrics and Gynaecology (1957, 1959).

FERRATE, Juan, Lic (Barcelona), Associate Professor of Spanish (1961, 1964).

FIELD, Peggy Ann, SRN SCM (England), Dip T and S (McGill), Lecturer in Advanced Practical Obstetrics (1964, 1964).

FILIPCHUK, Cornel E., DDS (Alberta), Lecturer in Dentistry (1962, 1962).

FILIPKOWSKI, Miss Elizabeth Helen, BEd (Alberta), Assistant Professor of Elementary Education (1957, 1960).

FISHBOURNE, James William, BCom (Alberta), Secretary, Faculty of Arts and Science (1961, 1961).

FISHER, Douglas Grant, MSc (Saskatchewan), Assistant Professor of Chemical Engineering (1964, 1964).

FLOCK, Donald Louis, MS (Oklahoma), PhD (Texas), Professor of Petroleum Engineering (1957, 1963).

FLORENCE, Donald Eugene, DDS LDS (Toronto), Lecturer in Oral Anatomy (1946, 1952).

FOLINSBEE, Robert Edward, BSc (Alberta), MA PhD (Minnesota), Professor and Head of Geology (1946, 1955).

FORBES, John Allison, MEd (Alberta), Associate Professor of Elementary Education (1949, 1958).

FORD, George, MSc (Alberta), PhD (Stanford), Professor and Head of Mechanical Engineering (1942, 1959).

FORD, Harvey Wilson, BE BCom (Saskatchewan), Assistant Professor of Commerce (1963, 1963).

FORREST, James French, MA BLitt (Glasgow), AM PhD (Cornell), Associate Professor of English (1960, 1964).

FORSTER, William, MB BS (Durham), DPM (London), Associate Professor of Psychiatry (1958, 1960).

FOSTVEDT, Thorleif, BSc (Alberta), SM (Chicago), Associate Professor of Mathematics and Assistant Dean, Faculty of Graduate Studies (1945, 1955).

FOURNIER, Lionel Joseph, BCom BA (Brit. Columbia), BSc (McGill), MA (Alberta), Assistant Professor of Physical Education (1963, 1963).

FOWLER, Eldon Lloyd, MSc (Alberta), Associate Professor of Civil Engineering (1960, 1960).

FOX, Miss Elizabeth Ann, BA (Alberta), BLS (Toronto), Library Assistant (1964, 1964).

FRACAS, Gino Mark, BA (W. Ontario), BEd (Alberta), Assistant Professor of Physical Education (1960, 1960).

FRAGA, Serafin, Lic Dr (Madrid), Assistant Professor of Chemistry (1963, 1963).

FRANCIS, Robert Richardson, BA MD (Alberta), FRCS(C) FACS, Assistant Clinical Professor of Urologic Surgery (1951, 1960).

FRANCK, J. P., DipPhys DrDerNat (Hamburg), Assistant Professor of Physics (1963, 1963).

FRASER, Miss Barbara, MA (Toronto), Assistant Professor of History and Executive Secretary, History Department (1961, 1961).

FRASER, Robert Stewart, MSc MD (Alberta), FRCP(C) FACP, Professor of Clinical Medicine (1953, 1964).

FRAZER, Miss Frances Marilynn, BA (McMaster), MA (British Columbia), Assistant Professor of English (1963, 1963).

FREEMAN, Gordon R., MA (Saskatchewan), PhD (McGill), DPhil (Oxford), FCIC, Associate Professor of Chemistry (1958, 1962).

FREIFIELD, Miss Norma Elizabeth, BA (Alberta), BLS (Toronto), Circulation Librarian (1941, 1950).

FREW, William Douglas, MB ChB (Edinburgh), FRCS(C) FACS, Assistant Clinical Professor of Obstetrics and Gynaecology (1952, 1959).

FRITZ, John Otto, BCom (Manitoba), MA (Minnesota), MSc EdD (Indiana), Associate Professor of Secondary Education (1961, 1961).

FUERST, Heinrich, MD (Munich), Clinical Instructor in Psychiatry (1961, 1961).

FULLER, William Albert, MA (Saskatchewan), PhD (Wisconsin), Associate Professor of Zoology (1959, 1963).

GADS,Leonard Eustace, BSc (Alberta), Professor and Associate Dean of Engineering (1939, 1959).

GAIN, Edward Alexander, BA MD (Alberta), FACA, Professor and Head of Anaesthesia (1949, 1964).

GAINER, Walter Dunham, BSc (Alberta), MS (Iowa), PhD (Massachusetts Institute of Technology), Professor and Head of Economics (1950, 1964).

GALLAGHER, James Emmet, BEd (Alberta), Assistant Professor of Industrial and Vocational Education (1963,1963).

GANDER, Thomas Alfred, MBE MD (Alberta), Associate Clinical Professor of Paediatrics 1950, 1959).

GANS, Leo John, BSc MD (Alberta), Instructor in Obstetrics and Gynaecology (1959, 1963).

GARG, K. M., BSc MBc MSc PhD (Lucknow), Assistant Professor of Mathematics 1964, 1964).

GELDART, Stanley Gordon, DDS (Alberta), Associate Professor of Operative Dentistry (1958, 1960).

GIBB, George Hildon, BSc DDS (Alberta), Associate Professor and Head of Restorative Dentistry (1959, 1961).

GIBBARD, Miss Margaret, BSc (British Columbia), Dietitian, Athabasca Hall.

GIBBS, John Theodore, BA BChir MB (Cantab), Assistant Clinical Professor of Psychiatry (1962, 1963).

GILBERT, James Alan Longmore, MB ChB MD FRCP (Edinburgh), FRCP(C) MRCP (London), Professor of Clinical Medicine (1950, 1963).

GILLES, John William, MA MEd (Alberta), EdD (Stanford), Professor of Educational Psychology, Director of Summer Session and Evening Credit Program (1945, 1955).

GILSDORF, Robert Raymond, BIE (Ohio State), MA (Yale), Assistant Professor of Political Science (1964, 1964).

GLYDE, Henry George, ARCA (London), RCA, Professor and Head of Fine Arts, Curator of University Art Gallery and Museum (1946, 1949).

GODFREY, Denis Rowley, BA PhD (Dublin), Associate Professor of English (1950, 1957).

GOODALE, Denis, BCom (Saskatchewan), MBA (Washington), CA RIA, Associate Professor of Accounting (1950, 1955).

GOODMAN, Yvonne Elizabeth, BSc (Alberta), Sessional Instructor in Bacteriology and Assistant Bacteriologist, Provincial Laboratory (1959, 1959).

GOODWIN, James William, MD (Toronto), FRCS(C), Associate Professor of Obstetrics and Gynaecology (1963, 1963).

GOUNDREY, Gordon Kenneth, BA (British Columbia), MA (Toronto), Associate Professor of Economics (1958, 1960).

GRAHAM, William Arthur Grover, MA (Saskatchewan), PhD (Harvard), Associate Professor of Chemistry (1962, 1962).

GRAHAM, William Hugh, MD MCh BAO (Belfast), Instructor in Anaesthesia (1959, 1959).

GRAY, Gordon Cameron, MD (Toronto), Instructor in Surgery (1951, 1951).

GREENE, Edward Joseph Hollingsworth, MA (Alberta), DU (Paris), Professor of French and Head of Modern Languages (1938, 1953).

GREENHILL, Hon. Stanley, MD DPH (Toronto), Professor and Head of Preventive Medicine, Consulting Physician, Student Health Service (1947, 1959).

GRESCHUK, Miss Corinne Petrusia, BSc HEc (Alberta), MS (Illinois), Lecturer in Household Economics (1964, 1964).

GRIEVE, Clarence Melross, BSA Dip Ed (Manitoba), Dip (ICTA, Trinidad), MSc (Manitoba), PhD (Alberta), Assistant Professor Animal Nutrition, Animal Science (1964, 1964).

GRIFFIN, Ernest George, BS AM PhD (Columbia), Assistant Professor of English (1963, 1963).

GRISDALE, Lloyd Carl, BSc MD (Alberta), Assistant Clinical Professor of Paediatrics (1951,1959).

GROVES, Thomas David Douglas, BSA MSA (British Columbia), PhD (Purdue), Assistant Professor of Animal Physiology (1964, 1964).

GUILD, Julius, BSc MD (Alberta), DPM (London), Assistant Professor of Psychiatry 1957, 1963).

GULLEY, John Lewis, MD (Toronto), Instructor in Orthopaedic Surgery (1959, 1961).

GULUTZAN, Metro, BA BEd (Saskatchewan), PhD (California), Associate Professor of Educational Psychology (1962, 1964).

GUNNING, Harry Emmet, MA PhD (Toronto), FRSC, Professor and Head of Chemistry (1957, 1957).

HADDOW, James Baird, BSc (St. Andrews), MSc (Alberta), PhD (Manchester), Associate Professor of Mechanical Engineering (1955, 1960).

HAGEN, Mrs. Eva Odette, MB ChB (Manchester), Assistant Pofessor of Anatomy (1961, 1961).

HALL, William Francis Melville, BA MD (Alberta), FRCS(C). Assistant Clinical Professor in Surgery (1951, 1964).

HAMILTON, Miss Dorothy Isabel, BA (Alberta), BSLS(Washington), AMLS (Michigan), Head of Rare Books and Archives (1929, 1929).

HAMPTON, Alexander, BA MSc (Sydney), PhD (London), Associate Professor of Biochemistry (1963, 1963).

HANLON, Peter, BA (Sir Geo. Williams), BLS (McGill), First Assistant, Cataloguing Department, Library (1961, 1964).

HANSON, Eric John, BA (Queen's), MA (Alberta), PhD (Clark), Professor and Head of Political Economy and Associate Dean of Graduate Studies (1964, 1964).

HANSON, Samuel, MD (Alberta), FCAP, Associate Professor of Pathology (1946, 1950).

HAQUE, Wahidul, MA (Dacca), MS (Stanford), Assistant Professor of Economics (1963, 1963).

HARDIN, Robert Toombs, BSA (Georgia), MS (Purdue), Assistant Professor of Poultry Genetics (1962, 1962).

HARDY, Albert William, MD (Alberta), FACS FRCS(C), Assistant Clinical Professor of Surgery (1940, 1954).

HARDY, Robert Macdonald, BSc DSc (Manitoba), MSc (McGill), FRCS DLS ALS, Dean of Engineering (1930, 1947).

HARGREAVES, Henry Allen, MA (Mount Allison), PhD (Duke), Assistant Profesosr of English (1963, 1963).

HARLAND, S., MA (Leeds), FLA (England), Assistant Librarian (1961, 1961).

HARPER, Robert Johnston Craig, MA (St. Andrews and Edinburgh), PhD (Edinburgh), Associate Professor of Educational Psychology (1954, 1962).

HARRIES, Hubert, BSc (Alberta), MA (Toronto), MS PhD (Iiowa), Dean of Commerce (1959, 1960).

HARRINGTON, Miss Betty Nannette Nixon, BNursing (McGill), Lecturer in Nursing (1962, 1962).

HARRIS, Derald A., BSc Eng (Alberta), MBA (W. Ontario), Assistant Professor of Commerce (1963, 1963).

HARRIS, Walter Edgar, MSc (Alberta), PhD (Minnesota), Professor of Chemistry (1946, 1962).

HARRISON, Robert Cameron, MD (Alberta), MSc (Toronto), FRCS(C) FACS, Professor of Surgery (1951, 1960).

HARYETT, Rowland Dalton, DDS MSc (Toronto), Associate Professor of Orthodontic Dentistry (1954, 1958).

HAWES, Harold Richard, BSc (Alberta), Assistant to the President (1953, 1963).

HAWRYSH, Mrs. Zenovia Jean, BSc (Alberta), MS (Michigan), Assistant Professor of Household Economics (1960, 1962).

HAYNES, E. R., MA BCh BAO (Trinity College, Dublin), Sessional Instructor in Preventive Medicine (1963, 1963).

HEAD, Ivan Leigh, BA LLB (Alberta), LLM (Harvard), Associate Professor of Law (1963, 1963).

HEATH, Charles, MSc (Alberta), PhD (Minnesota), Associate Professor of Physiology (1949, 1958).

HEBB, Surgeon Commander Harvey Douglas, BSc MD CM (Dalhousie), Sessional Instructor in Surgery (1957, 1957).

HEENEY,W. Brian D., BA (Toronto), BD (Episeopal Seminary, Cambridge, Mass.), D Phil (Oxon), Assistant Professor of History (1962, 1962).

HENDERSON, Joseph Franklin, MS (Arizona), PhD (Wisconsin), Associate Professor of Biochemistry (1963, 1963).

HENDERSON, Robert Selby, MRCS (England), FRCP (London), FRCS (England), FRCS(C) FACS, Instructor in Orthopaedic Surgery (1957, 1957).

Henderson, Ruth McClintock, MS PhD (Minnesota), Assistant Professor of Physiology (1963, 1963).

HENDIN, Irving Donald, BSc MD (Manitoba(, Lecturer in Radiology (1961, 1964).

HERGOTT, C. W., MD (Alberta), Sessional Instructor in Preventive Medicine (1963, 1963).

HERTZMAN, Lewis, BA (Toronto), AM PhD (Harvard), Associate Professor of History (1959, 1963).

HICKMAN, Cleveland Pendleton, BA (DePauw), MS (New Hampshire), PhD (British Columbia), Associate Professor of Zoology (1958, 1963).

HILLIARD, Joseph Ralph, MD (Toronto), FRCP(C), Assistant Clinical Professor in Medicine (1960, 1964).

HIRABAYASHI, Gordon Kiyoshi, MA PhD (Washington), Professor of Sociology and Head, Department of Sociology and Anthropology (1959, 1964).

HITCHIN, Edward, MD (Alberta), Lecturer in Surgery (1939, 1948).

HLYNKA, John Nicholas, BSc (Alberta), MSc (Philadelphia College of Pharmacy), Lecturer in Pharmacy (1963, 1963).

HNATKO, Stephen Ian, BSc MD (Alberta), MA (Toronto), Sessional Lecturer in Bacteriology (1959, 1960).

HOBART, Charles Warren, BA (Redlands), MA (S. California), PhD (Indiana), Associate Professor of Sociology (1962, 1964).

HOCKING, Brian, BSc PhD (London), MSc (Alberta), ARCSc, Professor and Head of Entomology (1946, 1956).

HOGGE, Harvey Leslie, BSc (Alberta), Lecturer in Preventive Medicine (1953, 1955).

HOHN, Emil Otto, MB BS MSc PhD (London), MRCS, Associate Professor of Physiology (1947, 1952).

HOLDEN, Miss Anita June, BA (London), MA (McMaster), Lecturer in French (1964, 1964).

HOLMES, Clarence Edward, BA MD (Alberta), Instructor in Radiology (1956, 1956).

HOLMES, John Carl, BA (Minnesota), MA PhD (Rice Institute), Associate Professor of Zoology (1959, 1964).

HOOPER, Major Roland Charles Wilkins, Diploma of Graduation (Royal Military College), Dean of Men (1960, 1960).

HOPKYNS, John Creasey Wykeham, MA BM BCh (Oxford), MRCP (London), Instructor in Medicine (1953, 1953).

HORNER, Ronald Hilborn, MD (Alberta), FACS DABOG FRCOG, Clincal Professor of Obstetrics and Gynaecology (1942, 1957).

HOSPERS, Jan, BA (Groningen), MA (Utrecht), PhD (Cantab), Professor of Geophysics 1963, 1963).

HOUGH, Rev. Arthur John Bates, MA (W. Ontario), Licentiate in Theology (St. John's, Winnipeg), Associate Professor of Psychology, Counsellor and Director of Student Counselling Services (1955, 1964).

HOWARTH, Edgar, MSc (Manchester), PhD (Melbourne), Associate Professor of Psychology (1960, 1960).

HOWELL, Mrs. Leila, MD CM BLS (McGill), LRAM (London), Library Assistant (1963, 1963).

HOWELL, Maxwell Leo, MA EdD (California), Professor of Physical Education (1961, 1963).

HUCKELL, John Richmond, BSc (Alberta), MD CM (McGill), FRCS(C), Instructor in Surgery (1959, 1961).

HUNKA, Stephen, MEd (Alberta), PhD (Illinois), Asociate Professor of Educational Psychology (1961, 1964).

HUNTER, Edward Frederick, BCom (Alberta), Purchasing Agent, (1948, 1948).

HUSEL, Don Harold, BSc MD (Alberta), Instructor in Obstetrics and Gynaecology (1958, 1963).

HUSTON, Mervyn James, MSc (Alberta), PhD (Washington), FCIC, Professor and Dean of Pharmacy (1940, 1955).

HUTTON, Margaret MacSteven, BA MD (Alberta), FRCS(C) FACS FACOG, Assistant Clinical Professor of Obstetrics and Gynaecology (1944, 1957).

HYDE, Harry Alexander, MD (Toronto), FRCS(C), Instructor in Surgery (1960, 1962).

HYDUK, Miss Zennia Montana, MSc (Alberta), Assistant Professor of Mathematics (1958, 1961).

HYNAM, Charles A. S., DipICTA (Trinidad), MS PhD (Cornell), Assistant Professor of Sociology (1962, 1962).

HYNDMAN, Charles Frederick, MD CM (Queen's), Assistant Clinical Professor of Radiology (1953, 1963).

HYRAK, Wasyl, MIuris DIuris (Ukrainian University, Munich), BLS (McGill), Library Assistant (1962, 1962).

IRONSIDE, Robert Geoffrey, BA (Dunelm), Assistant Professor of Geography (1963, 1963).

ISRAEL, Werner, MSc (Cape Town), PhD (Dublin), Associate Professor of Mathematics 1958, 1963).

JACKA, Reginald Charles, BSc (Alberta), SM (Chicago), Associate Professor of Mathematics and Assistant Dean, Faculty of Science (1945, 1964).

JACKSON, Dennis E., BSc PhD (Dunelm), Assistant Professor of Geology (1962, 1962).

JACKSON, Harold, MSc (Nottinghan), Assistant Professor of Dairy Science (1963, 1963).

JACOBY, Arthur Philippe, BA (Park College, Missouri), PhD (Rochester), Assistant Professor of Sociology (1961, 1961).

JENKINSON, Mrs. Marion Ellen Dixon, BA (Manchester), PhD (Chicago), Associate Professor of Elementary Education (1958, 1961).

JENSEN, Thomas Ronald, BS (BYU) MEd (Illinois), Assistant Professor of Vocational Education (1963, 1963).

JESPERSEN, Reuben Edward, BA MD (Alberta), Sessional Instructor in Surgery (1956, 1956).

JOHNS, Johnny Gus, BCom (Saskatchewan), MBA (Berkeley), Assistant Professor of Commerce (1964, 1964).

JOHNS, Walter Hugh, BA LLD (W. Ontario), PhD (Cornell), D-ès-L (Laval), President

JOHNSON, Eric William, BSc (London), Assistant Professor of Mechanical Engineering (1958, 1958).

JOHNSON, LeRoy Peter Vernon, MSc (Alberta), PhD (Washington), Professor of Genetics (1948, 1950).

JOHNSTON, Donald Cooper, MD (Alberta), FRCS(C), Lecturer in Orthopaedic Surgery (1951, 1951).

JOHNSTON, Robert James, MD (Alberta), FRCS(C), Assistant Clinical Professor of Surgery (1953, 1956).

JONES, John Robert Blakely, DSO OBE CD BSc (Alberta), Campus Development Officer.

JONES, William J., BA PhD (London), Assistant Professor of History (1961, 1961).

JUDGE, David Lawrence Crawford, BSc MD (Alberta), FRCP(C), Assistant Clinical Professor of Medicine and Pathology.

JULIUS, Robert Stanley, MA (Bfitish Columbia), PhD (Alberta), Associate Professor and Assistant Head of Computing Science (1961, 1964).

KALANTAR, Alfred Husayn, BS (Rutgers), PhD (Cornell), Assistant Professor of Chemistry (1964, 1964).

KALBACH, Warren Edwin, MA PhD (Washington), Associate Professor of Sociology (1961, 1964).

KALINOWSKY, Michael, Dip (Ecole Supérieure de Commerce, Paris), Lecturer in French (1963, 1963).

KANASEWICH, Ernest Raymond, MSc (Alberta), PhD (Brit. Columbia), Assistant Professor of Physics (1963, 1963).

KANTAUTUS, A., BCom (Copenhagen), MLS (Washington), Library Assistant (Orders) (1960, 1960).

KASPER, Thaddeus Alphonsus, BSc MD (Alberta), Associate Professor of Pathology 1961, 1964).

KATZ, Martin, BA (Stanford), MA (Berkeley), Assistant Professor of History (1962, 1962).

KAY, Cyril Max, BSc (McGill), PhD (Harvard), Associate Professor of Biochemistry (1958, 1961).

KEBARLE, Paul, DipIng (Zurich), PhD (British Columbia), Associate Professor of Chemistry (1958, 1963).

KELEMAN, Andor, MD (Pecs, Hungary), Sessional Instructor in Preventive Medicine (1963, 1963).

KEMP, Edward Wilson, BEd MA (Alberta), Assistant Professor of Philosophy (1964, 1964).

KELLNER, Mrs. Hazel E., BA (Saskatchewan), BLS (Toronto), Library Assistant (1963, 1963).

KELLEY, Miss Sheila Joan, BSc (McMaster), BLS (Toronto), Library Assistant (1963, 1963).

KELLY, Donald Harry, MSc (Alberta), Associate Professor of Electrical Engineering 1958, 1963).

KELLY, Francis John, MA (San Jose State), PhD (Texas), Associate Professor of Educational Psychology (1964, 1964).

KENNEDY, James Stewart, MSc (Alberta), PhD (Stanford), Associate Professor of Mechanical Engineering (1955, 1959).

KEINNEDY, Miss Lorene Louise, MSc (Alberta), PhD (Iowa), Associate Professor of Botany (1946, 1958).

KIDD, Edward Garland, BSc MD (Alberta), Lecturer in Medicine (1952, 1957).

KIMMITT, Patrick John, BSc MD (Alberta), Instruction in Paediatrics (1958, 1958).

KING, Miss Ethel Margeurite, BEd (Albrta), MA (Iowa), PhD (Iowa State), Associate Professor of Education (1955, 1962).

KING, Robert William, BSc (Alberta), Assistant Professor of Electrical Engineering (1947, 1955).

KINGMA, Ynte Jacob, Ing (Delft), Associate Professor of Electrical Engineering (1958, 1962).

KLATTE, William Frederick, MA PhD (Chicago), Assistant Professor of Medern Languages (1963, 1963).

KLAWE, Janusz J., Dipcom (Grenoble), MA (Glasgow), Associate Professor of Geography (1963, 1963).

KLING, Samuel, BA (Saskatchewan), MD (Toronto), FRCS(C) FACS, Assistant Clinical Professor of Surgery and Director of Continuing Medical Education (1951, 1964).

KNILL, William Douglas, BEd (Alberta), MA Montana State), EdD (Oregon), Associate Professor of Educational Administration (1962, 1962).

KNOWLER, Albert Stephen, BCom (Alberta), Accountant (1954, 1963).

KNOWLES, Robert Hugh, BSA (Toronto), MSc (Alberta), Associate Professor of Horticulture, Grounds Superintendent (1948, 1954).

KOCH, Edward Leo, BSc (State University College, Buffalo N.Y.), EdM (Buffalo), Assistant Professor of Education (Elementary) (1964, 1964).

KONCZACKI, Zbigniew Andrzej, BSc (London), BEcon (Natal), Associate Professor of Economics (1963, 1963).

KOPECKY, Karl R., BSc (Iowa), PhD (UCLA), Assistant Professor of Chemistry (1961, 1961).

KORNO-WALOFF, Simon, MB BCL (Johannesburg), FCPSA MRCP(C), Teaching Fellow in Medicine (1961, 1961).

KOTRC, Ronald Fred, BA (Nebraska), MA (Washington), Lecturer in Classics (1964, 1964).

KOWALEWSKI, Konstanty Piotr, MPh (Warsaw), MD PhD (Brussels), Associate Professor of Experimental Surgery (1955, 1959).

KREISEL, Henry, MA (Toronto), PhD (London), FIAL, Professor and Head of English (1947, 1961).

KROUSE, Roy Howard, BSc PhD (McMaster), Assistant Professor of Physics (1960, 1960).

KUSPIRA, John, BSA, MSc (Saskatchewan), PhD (Alberta), Associate Professor of Genetics (1955, 1959).

LA ROI, George Henri, BA (Lake Forest College), MA (Duke), Assistant Professor of Botany (1963, 1963).

LA TERREUR, Marc, BA (Montreal), L-ès-L (Laval), Assistant Professor of History 1964, 1964).

LAKEY, William Hall, BSc MD (Alberta), FRCS(C), Associate Professor of Surgery (1960, 1964).

LAMPARD, Miss Dorothy, BA (Manitoba), MA (Chicago), Associate Professor of Elementary Education (1952, 1957).

LANE, Arnold H., DDS (McGill), Lecturer in Dentistry (1962, 1962).

LANE, Byron George, BA PhD (Toronto), Associate Professor of Biochemistry (1961, 1964).

LARSEN, Donald Erik, BA (Minnesota), MA (Indiana), Assistant Professor of Sociology (1964, 1964).

LASKIN, Manuel Mervin, BA (Saskatchewan), MD (Toronto), FRCS(C), Instructor in Surgery (1959, 1963).

LASKIN, Richard, BA (City College of New York), MA PhD (Pennsylvania), Assistant Professor of Sociology (1960, 1960).

LASKOWSKI, Seno, BA (Alberta), BLS (Brit. Columbia), Library Assistant (1963, 1963).

LAUERMAN, J., BSc MD (Alberta), Sessional Instructor in Preventive Medicine (1963, 19693).

LAURENSON, Rae Duncan, MB ChB (Aberdeen), Associate Professor of Anatomy (1963, 1963).

LAYCHUK, Julian Louis, MA (Alberta), Assistant Professor in Russian and Administrative Officer, Department of Slavonic Languages. (1962, 1964).

LAYCOCK, Arleigh Howard, BA (Toronto), PhD (Minnesota), Associate Professor of Geography (1955, 1960).

LE VANN, Leonard Jan, LRCP LRCS (Edinburgh), LRFPS (Glasgow), Lecturer in Psychiatry (1964, 1964).

LEE, Miss Ann Marie, BA (Victoria), BLS (British Columbia), Library Assistant (1964, 1964).

LEE, Charles A., BBA, MBA (North Texas State), Associate Professor of Commerce (1962, 1962).

LEEDER, James Richard, BSc MD (Alberta), Instructor in Obstetrics and Gynaecology (1955, 1956).

LEESON, Thomas Sydney, MA MD (Cantab), MB BChir (Londan), Professor and Head of Anatomy (1963, 1963).

LEFEBVRE, Charles, BA (Laval), MD (Alberta), Lecturer in Medicine (1942,1959).

LEITCH, Lorne Campbell, LLB (Manitoba), MBA (Chicago), Associate Professor of Commerce (1961, 1961).

LEJA, Jan, BSc (London), DipIng (Cracow), PhD (Cambridge), FCIC, Professor of Metallurgy (1957, 1963).

LEMIEUX, Raymond Urgel, BSc (Alberta), PhD (McGill), Professor of Organic Chemistry (1961, 1961).

LERBEKMO, John Franklin, BASc (British Columbia), PhD (California), Associate Professor of Geology (1956, 1960).

LESINS, Karlis Adolfs, BAgr (Latvia), LicAgr (Sweden), DSc (Alberta), Associate Research Professor of Genetics and Plant Breeding (1954, 1962).

LEVERSEDGE, Miss Lillian Emily Mary, BA (Alberta), BLS (Toronto), Order Librarian 1946, 1947).

LEWIN, Victor, AA (Marin), AB PhD (California), Associate Professor of Zoology (1958, 1964).

LIEBEL, Miss Helen Pauline Grit, BA (Brooklyn), MA PhD (Northwestern), Assistant Professor of History (1962, 1962).

LILGE, Ewald Oscar, MSc (Alberta), Professor and Head of Mining and Metallurgy (1936, 1954).

LILLELEHT, Lembit Uno, BChE (Delaware), MSE (Princeton), PhD (Illinois), Associate Professor of Chemical Engineering (1960, 1962).

LINDSTEDT, Sidney Axel, BSc (Alberta), PhD (Wisconsin), Professor of Education (1955, 1963).

LINTON, Neville Oswin, BCom (McGill), MA MALD (Fletcher), Assistant Professor of Political Science (1962, 1962).

LITTLE, Adam Sharpe, MD (Manitoba), FRCP(C), Assistant Professor of Medicine (1956, 1960).

LIVINGSTON, Arthur Eugene, BA (Fresno State College), MA PhD (Oregon), Professor of Mathematics (1962, 1964)

LLOYD, A., BA MD (Alberta), Sessional Instructor in Preventive Medicine (1963, 1963).

LOCK, Gerald Seymour Hunter, BSc PhD (Durham), Associate Professor of Mechanical Engineering (1963, 1964).

LOCKWOOD, Charles McDonald, BASc (Toronto), DipBusAdm (W. Ontario), Associate Professor in Extension (1963, 1964).

LONGLEY, Richmond W., BSc (Acadia), AM EdM (Harvard), MA (Toronto), Associate Professor of Geography and Mathematics (1959, 1962).

LONGWORTH, Jack, BSc (Alberta), MSc (Illinois), Professor of Civil Engineering (1945, 1962).

LORCH, Lee, BA (Cornell), MA PhD (Cincinnati), Professor of Mathematics (1959, 1962).

LOVE, Harold Clyde, MS (Kansas State), PhD (Iowa State), Professor of Agricultural Economics (1962, 1962).

LOWIG, Henry Francis Joseph, DrRerNat (Prague), DSc (Tasmania), Associate Professor of Mathematics (1957, 1957).

LOWN, James Wiliam, BSc, ARCS PhD DIC (Imperial College, London), Assistant Professor of Chemistry (1964, 1964).

LUNGSTRASS, Hanns W., DipVolkswirt DrRerPol (Cologne), Assistant Profesor of Sociology (1962, 1962).

LUPTON, Mrs. Caroline, BA (McMaster), BLS (Toronto), Library Assistant (1964, 1964).

LUPUL, Manoly Robert, BA BEd (Alberta), MA (Minnesota), PhD (Harvard), Associate Professor of Educational Foundations (1958, 1963).

LYTWYNEC, Mrs. Natalie, Certificate (Library School, New Zealand), Library Assistant (1964, 1964).

McALPINE, D. G., MD (Alberta), Sessional Instructor in Preventive Medicine (1963, 1963).

MacARTHUR, Russell Stuart, MEd (Alberta), PhD (London), Professor of Educational Psychology (1955, 1959)

MACBETH, Robert Alexander Leslie, BA MD (Alberta), MSc (McGill), FRCS(C) FACS, Professor and Head of Surgery (1953, 1960).

McCALLA, Arthur Gilbert, MSc (Alberta), PhD (California), FAIC, FRSC, Professor of Plant Biochemistry and Dean of Graduate Studies (1940, 1957).

McCALLA, Robert Irvine, BSc, MD (Alberta), Sessional Instructor in Pharmacology, Honorary Instructor of Anaesthesia (1957, 1957).

McCARTEN, Alan Brock, MD (Manitoba), FRCS (England), FRCS(C), Assistant Clinical Professor of Surgery (1951, 1954).

McCAUGHEY, Gerald Sheidon, BA (McGill), MA (Washington), Assistant Professor of English (1963, 1963).

McCLELLAND, Richard Charles, DDS (Alberta), Assistant Professor of Prosthetic Dentistry (1952, 1962).

McCLURE, Miss Ruth Elizabeth, RN BSc (Alberta), MPH (Pittsburgh), Associate Professor and Director of the School of Nursing (1956, 1957).

MacDONALD, Miss Emma, BA (Brit. Columbia), BLS (Toronto), Science Librarian (1949, 1951).

MACDONALD, Gordon Reid, BSc MD (Alberta), FACP, Assistant Professor of Pathology (1951, 1958).

MacDONALD, John, MA (Edinburgh), EdB PhD (Glasgow), Associate Professor of Educational Psychology (1958, 1962).

McDONALD, Brian Hugh, BCom (Saskatchewan), MBA (California), Assistant to the President (1961, 1961).

MACDOUGALL, Douglas Harvey, DDS (Toronto), Assistant Professor of Dentistry (1958, 1962).

McELROY, Laird Ward, MSc (Alberta), PhD (California), FAIC, Professor and Head of Animal Science (1943, 1951).

MacGREGOR, Donald Gordon, DDS (Alberta), Associate Professor of Oral Diagnosis (1953, 1953).

MacGREGOR, James Grierson, BSc (Alberta), MS PhD (Illinois), Associate Professor of Civil Engineering (1960, 1963).

McGEACHIN, Stewart Guthrie, BSc PhD (Glasgow), Assistant Professor of Chemistry (1964, 1964).

McGREGOR, John Ross, BSc MEd (Alberta), PhD (Cambridge), Associate Professor of Mathematics (1959, 1963).

MACGREGOR, John Watt, BA MD (Alberta), FRCP(C), Professor and Head of Pathology (1932, 1951).

MacHARDY, Fenton Vincent, BE (Saskatchewan), MS (Northwestern), Professor and Head of Agricultural Engineering (1950, 1958).

MacINNES, Glenda J., BA BLS (British Columbia), Library Assistant (1964, 1964).

MacINTYRE, Jean A., BA (Bryn Mawr), MA PhD (Yale), Assistant Professor of English (1962, 1963).

McINTYRE, John William Ransome, MRCS LRCP FFARCS (England), Assistant Professor of Anaesthesia (1964, 1964).

McKENZIE, Alvin Hubert, BSc MD (Alberta), MCOrth (Liverpool), FRCS(C), Instructor in Orthopaedic Surgery (1960, 1961).

MacKENZIE, Bruce Munro, DDS (Alberta), Sessional Lecturer in Prosthetic Dentistry (1951, 1954).

MacKENZIE, Miss Margery Walker, BA BEd (Alberta), AM (Stanford), Associate Professor of Classics (1947, 1964).

MacKENZIE, Walter Campbell, BSc MD CM (Dalhousie), MS (Minnesota), FACS FRCS(C) HonFRCS, Dean of Medicine (1939, 1959).

McKINNEY, Richard Leroy, MA (Syracuse), PhD (Washington), Assistant Professor of Mathematics (1962, 1962).

McLACHLIN, Herbert John, BSc (McGill), MSc (Washington), Associate Professor of Physical Education (1948, 1956).

MacLACHLAN, Thomas Butler, MD (Toronto), FRCS(C), Teaching Fellow in Obstetrics and Gynaecology (1963, 1963).

MacLEAN, Hector Robertson, DDS (Alberta), FACD FICD, Dean of Dentistry (1936, 1958).

MACLEAN, William Alexander, MD (Manitoba), FRCS(C), Lecturer in Surgery (1958, 1964).

McLEOD, Lionel Everitt, BSc MD (Alberta), MSc (McGill), FRCP(C), Associate Professor of Medicine, Hon. Lecturer in Biochemistry (1957, 1963).

McMASTER, Rowland Douglas, MA PhD (Toronto), Associate Professor of English (1958, 1962).

McMINN, William Barton, BSc (Toronto), Assistant Professor of Computing Science (1962, 1962).

McMURCHY, Kenneth Alan, BA (Saskatchewan), DDS (Alberta), Professor and Head of Dental Science, Honorory Instructor in Anatomy (1948, 1961).

McNAMEE, John Joseph, BE BSc (Dublin), PhD (London), Professor of Mathematics and of Computing Science (1958, 1963).

MacNAB, Ross B. J., BS (Michigan), MA (Michigan State), Assistant Professor of Physical Education (1963, 1963).

McPHAIL, Clarence, W. B., BSc DDS (Alberta), MSD (Northwestern), FICD, Associate Professor and Head of Public Health Dentistry, Assistant to the Dean (1959, 1963).

MacPHEE, H. D., MB ChB (Edinburgh), Sessional Iinstructor in Preventive Medicine (1963, 1963).

MacPHERSON, Alexander Donald, MD (Alberta), Assistant Clinical Professor of Psychiatry (1947, 1955).

MacRAE, Patrick Daniel, DDS (Alberta), Assistant Professor of Restorative Dentistry (1960, 1961).

MACKIE, George Owen, MA DPhil (Oxford), Associate Professor of Zoology (1956, 1962).

MADSEN, Neil Bernard, MSc (Alberta), PhD (Washington, St. Louis), Associate Professor of Biochemistry (1962, 1962).

MAHON, William Allan, LRCP LRCS (Edinburgh), LRFP&S (Glasgow), Associate Professor of Pharmacology and Assistant Professor of Medicine (1962, 1962).

MALCOLM, John, MA (Queen's), PhD (Princeton), Assistant Professor of Philosophy (1963, 1963).

MALLETT, Marshall, MD CM (McGill), Lecturer in Radiology (1946, 1956).

MANCHESTER, Frank Derek, MSc (New Zealand), PhD (British Columbia), Associate Professor of Physics (1958, 1961).

MANDEL, Elias W., MA (Saskatchewan), PhD (Toronto), Professor of English (1957, 1964).

MANNING, Travis Warren, MSc (Oklahoma), PhD (Minnesota), Professor and Head of Agricultural Economics and Farm Management (1962, 1962).

MARAHRENS, Gerwin, PhD (Freiburg), Assistant Professor of German (1962, 1962).

MARDEN, Philip Wobber, BA (Rutgers), MA PhD (Illinois), Assistant Professor of Sociology (1964, 1964).

MARDIROS, Anthony Manuel, MA (Melbourne), MLitt (Cambridge), Professor and Head of Philosophy (1946, 1957).

MARKLE, Alexander Gilmour, BA BEd (Alberta), BJ (Carleton), Alumni Secretary and Press Officer (1951, 1951),

MARKS, Gerald Samuel, MSc (Cape Town), DPhil (Oxon), Associate Professor of Pharmacology (1962, 1964).

MARSHALL, Frederick Chester, BSc MD (Alberta), FRCS(C), Instructor in Urology (1963, 1963).

MARTIN, John Kenneth, MB BS MRCS MRCP DCH (London), Professor and Head of Paediatrics (1957, 1957).

MARTIN, John Scott, BA (Toronto), PhD (Columbia), Assistant Professor of Chemistry (1963, 1963).

MARXHEIMER, Edward, MA (California), Assistant Professor of French (1961, 1963).

MATAS, Matthew, MD (Alberta), Lecturer in Medicine (1951, 1967).

MATHESON, Miss Jean Isabel, BA (Saskatchewan), Instructor in Pathology and Medical Laboratory Sceince (1956, 1963).

MATHEWS, Robin Daniel Middleton, BA (British Columbia), MA (Ohio State), Assistant Professor of English (1961, 1962).

MAY, Edward Charles, BA (Trinity), MA PhD (Princeton), Associate Professor of Classics (1947, 1964).

MEHRA, Krishen L., MA (Panjab), PhD (Berkeley), Assistant Professor of Mathematics (1963, 1963).

MELNIKOV, George, LèsL (Lyons), CAPES (Aix), Assistant Professor of Russian (1961, 1963).

MELSNESS, Harold Clarence, BSc (Alberta), MA (Minnesota), Associate Professor of Educational Administration (1948, 1954).

MELTZER, Herbert, MD (Manitoba), Instructor in Thoracic Surgery (1946, 1946).

MENGES, Mrs. Eusrosinia Venita, BSc (Alberta), Assistant Dietitian in Residence Dining Halls (1960, 1960).

MENDRYK, Stephen, BEd in Phys Ed (Alberta), MS (California), Associate Professor of Physical Education (1955, 1961).

MERCER, Paul Frederick, DVM (Ontario Veterinary College), PhD (Cornell), Assistant Professor of Physiology (1964, 1964).

METCALFE, James Overgard, BSc MD (Alberta), FRCS(C), Clinical Professor of Urologic Surgery (1952, 1958).

MICHALYSHYN, Bohdan, MD (Alberta), FRCS(C). Clinical Professor of Surgery (1951, 1957).

MIELKE, Miss Frances, BA (Manitoba), BLS (Toronto), Library Assistant (1961, 1961).

MIKLOS, Erwin, BA BEd (Saskatchewan), MEd PhD (Alberta), Associate Professor of Educational Administration (1963, 1963).

MILLER, Mrs. Frances, MA (Toronto), Instructor in Genetics (1963, 1963).

MILLER, Jack David Raoul, BSc Eng MB Bch (Witwatersrand), Instructor in Radiology (1964, 1964).

MONCKTON, George, MB BS MD MRCP (London), FRCP(C), Associate Professor of Neurology (1957, 1958).

MONOD, Mrs. Madeleine Jacqueline, LèsSciences Sociales (Geneva), BEd (Alberta), Assistant Professor of Secondary Education (1963, 1963).

MOON, John Wesley, BA (Bethany Nazarene), MA Michigan State), PhD (Alberta), Assistant Professor of Mathematics (1964, 1964).

MOONIE, George T., BA (Saskatchewan), MD (Alberta), Instructor in Anaesthesia (1954, 1954).

MOORE, Charles Herald, BA (W. Ontario), DU (Paris), Associate Professor of French (1954, 1959).

MOORE, Miss Evelyn Ruth, MA (Sydney), Associate Professor of Elementary Education (1958,1964).

MORAVCIK, Ivo, BA (Ohio(, MA PhD (Indiana), Associate Professor of Economics 1960, 1963).

MOREAU, Joseph Paul, BA (Laval), MD (Alberta), FRCS(C), Lecturer in Orthopaedic Surgery (1950, 1958).

MORFORD, Walter Robert, MPE (British Columbia), Assistant Professor of Physical Education (1963, 1963).

MORGAN, Lynn Parkes, BA (McMaster), Associate Registrar (1956, 1964).

MORGANTE, Odosca, MD (Rome), MSc PhD (McGill), Assistant Professor of Bacteriology and Virology (1962, 1962).

MORRISON, John Cuthill, BSc PhD (Glasgow), Associate Professor of Pharmacy (1959, 1963).

MORTON, Guy Kent, MD (Alberta), Clinical Professor of Neurosurgery (1947, 1956).

MOSER, Leo, BSc (Manitoba), MA (Toronto), PhD (North Carolina), FRSC, Professor and Associate Head of Mathematics (1951, 1963).

MOSESON, Miss Helen Viola, BHEc (Alberta), MA (Michigan), Assistant Professor of Household Economics (1960, 1960).

MOSKALYK, Richard Edward, BSP MSc (Saskatchewan), Assistant Professor of Pharmacy (1963, 1963).

MOTUT, Roger George, BA (Laval), MA BEd (Alberta), Associate Professor of French and Assistant Dean of Arts (1958, 1964).

MOTYL, Miss Barbara Jane, BSc (Carleton), Sessional Instructor in Clinical Pathology (1956, 1960).

MOWAT, Gordon Leslie, BSc (Brigham Young), MA EdD (Stanford), Professor of Educational Administration (1957, 1960).

MOWATT, David Guthrie, BA PhD (London), Associate Professor of German (1964, 1964).

MOYER, Donald John, MD (Western Ontario), Honorary Sessional Instructor in Obstetrics and Gynaecology (1958. 1958).

MULLEN, Ronald Perry, BA LDS (Saskatchewan), DDS (Alberta), MSD (Northwestern), Assistant Professor of Dentistry (1958, 1958).

MULLOY, Joseph Edward, BA BCom (NUI), CA, Assistant Professor in Extension (1962, 1962).

MURDESHWAR, Mangesh Ganesh, MA (Bombay), PhD (Alberta), Assistant Professor of Mathematics (1964, 1964).

MURRAY, David Moore, BA (Dalhousie), Assistant Professor of Philosophy (1961, 1961).

MURRAY, David William, BSc (Alberta), MSc DIC (London), Associate Professor of Civil Engineering (1960, 1961).

MUSACCHIO, Enrico, BA (Baldwin Wallace College, Ohio), Dottre in filosofia (Universita degli studi, Rome), Assistant Professor of Italian (1963, 1963).

MYERS, Gordon Edward, MSc (Alberta), PhD (McGill), Professor and Head of Microbiology (1947, 1947).

NADER, Walter, MSc (Texas), DPhil (Vienna), Associate Professor of Petroleum Engineering (1960, 1963).

NARAYANA, Tadepalli, MA (Madras and Bombay), PhD (North Carolina), Associate Professor of Mathematics (1958, 1958).

NASH, Charles William, MSc PhD (Minnesota), Professor of Pharmacology (1954, 1957).

NAY, Marshall Alexander, MSc BEd (Alberta), Associate Professor of Secondary Education (1960, 1963).

NEILSON, George Croydon, MA PhD (British Columbia), Associate Professor of Physics (1959, 1961).

NELSON, James Malcolm, BA (W. Ontario), MA (Toronto), Assistant Professor of English (1963, 1963).

NELSON, Mrs. Jean Clyne, MB ChB (Aberdeen), Instructor in Paediatrics (1955, 1955).

NELSON, Leonard Doyal, MEd (Alberta), Associate Professor of Elementary Educatino (1959, 1959).

NELSON, Thomas Morgan, MA (Michigan State College), PhD (Michigan State University), Associate Professor of Psychology (1964, 1964).

NELSON, Thomas Robert, MB ChB (Edinburgh), MRCOG (London), FRCS(C) Clinical Associate Professor of Obstetrics and Gynaecology (1957, 1963).

NETTLER, Gwynn, AB (UCLA), MA (Claremont), PhD (Stanford), Associate Professor of Sociology (1964, 1964).

NEWBOUND, Kenneth Bateman, MSc (Manitoba), PhD (Massachusetts Institute of Technology), Professor of Physics and Associate Dean, Faculty of Science (1948, 1964).

NEWSON, Miss Dora Allison, BA MD (Alberta), Sessional Demonstrator in Pathology (1952, 1952).

NEWTON, Miss Bertha Morse, BSc (S. California), AM (Chicago), EdD (Missouri), Associate Professor of Education (1945, 1955).

NIX, Nelson William, BSc MD (Alberta), FACA, Lecturer in Anaesthesia) (1955, 1959).

NOBLE, Charles Emerson, BA BSc (Alberta), Provincial Analyst and Director of Industrial Laboratory (1935, 1953).

NODEN, Denys, MA (Cantab), BLS (McGill), Law Librarian (1956, 1956).

NURSALL, John Ralph, MA (Saskatchewan), PhD (Wisconsin), Professor of Zoology (1953, 1964).

NURSALL, Mrs. Mary, BA (Toronto), MA (Saskatchewan), Lecturer in Physiology (1954, 1964).

NUTTALL, John Blakely, MASc (British Columbia), DIC (London), Associate Professor of Civil Engineering (1961, 1963).

O'BRIEN, Robert Neville, MASc (British Columbia), PhD (Manchester), Associate Professor of Chemistry (1957, 1963).

O'DONOGHUE, James Gerard, DVM (Ontario Veterinary College), Lecturer in Veterinary Science (1948, 1948).

O'GRADY, Geoffrey Noel, BA (Syndey), Assistant Professor of Linguistics (1963, 1963).

OLSEN, William Charles, MSc (British Columbia), PhD (Alberta), Assistant Professor of Physics (1954, 1964).

OLSON, Eugene George, BA (Saskatchewan), BLS (McGill), Library Assistant (1964, 1964).

ORFORD-SMITH, Edward Stuart, MA MB BChir (Cambridge), DPH (London), MRCS (England), Lecturer in Preventive Medicine (1955, 1955).

ORRELL, John Overton, BA (Oxford), MA (Toronto), Assistant Professor of English (1961, 1961).

OSLER, Alan E., BA (Manitoba and Oxford), Lecturer in English (1961, 1961).

OSTOLOSKY, Raymond John(BSc MD (Alberta), FRCS(C) MRCOG, Instructor in Obstetrics and Gynaecology (1960, 1962).

OTTO, Frederick Douglas, MSc (Alberta), PhD (Michigan), Associate Professor of Chemical Engineering (1961, 1964).

PACKER, John George, BSc (London), Assistant Professor of Botany (1958, 1959).

PALMER, Keith Henry, MPharm (Nottingham), DU (Paris), Associate Professor of Pharmacy (1958, 1962).

PANAR, David, MSc (Michigan), Associate Professor of Mechanical Engineering (1946, 1955).

PARANCHYCH, William, BSc (Alberta), PhD (McGill), Assistant Professor of Biochemistry (1963, 1963).

PARANJAPE, B. V., MSc (Nagpur), PhD (Liverpool), Associate Professor of Physics (1961, 1964).

PARKER, Howard Arthur, MA (Washington), Assistant Professor of Sociology (1963, 1963).

PARKER-JERVIS, Noel, BA Dip Ed (British Columbia), Lecturer in English (1962, 1962).

PARLEE, Stephen Sackville, BSc MD (Alberta), FACS DABOG FRCOG, Assistant Clinical Professor of Obstetrics and Gynaecology (1947, 1963).

PASCOE, Herbert, BA MD Diploma Psychiatry (Toronto), FRCP(C), Instructor in Psychiatry (1959, 1963).

PASHNIAK, Daniel Walter, BS (Walla Walla), MS (Illinois), Assistant Professor of Mechanical Engineering (1963, 1963).

PASS, Lawrence Eugene, MA (Toronto), PhD (Alberta), Assistant Professor of Educational Psychology (1964, 1964).

PATCHING, Thomas Herbert, BSc (Alberta), Professor of Mining and Metallurgy (1947, 1958).

PATERSON, Alan Robb Phillips, MA PhD (British Columbia), Professor of Biochemistry and Director of the McEachern Laboratory (1962, 1962).

PATRICK, Andrew, MB ChB (Glasgow), FRCS(C), Sessional Instructor in Surgery (Ophthalmology) (1964, 1964).

PAUL, William Morris, MD (Toronto), FRCS(C), Professor and Head of Obstetrics and Gynaecology (1962, 1962).

PAWLUK, Steven, MSc (Alberta), PhD (Minnesota), Associate Professor of Soil Science (1959, 1963).

PAYNE, Irving John, MA (Britnsh Columbia), PhD (Pennsylvania), Associate Professor of Bacteriology (1960, 1964).

PEACOCK, Gordon Bruce, BEd (Alberta), MA (Carnegie), Associate Professor of Drama (1953, 1958).

PEACOCKE, Charles Thomas, BEd BA (Alberta), MFA (Carnegie), Assistant Professor of Drama (1961, 1963).

PEARCE, James William, MD CM (Queen's), DPhil (Oxford), Professor and Head of Physiology (1955, 1955).

PEDDLE, Garry John Douglas, BS (Harding College, Arkansas), MA PhD (Toronto), Assistant Professor of Chemistry (1964, 1964).

PEEL, Bruce Braden, MA (Saskatchewan), BLS (Toronto), Librarian to the University (1951, 1956).

PENIKETT, Eric John Keith, MB BS PhD (London), MRCS, Professor of Bacteriology (1958, 1961).

PERRONI, Amedeo Francesco Giulio Giuseppe, BA (Toronto), Assistant Professor of Commerce (1962, 1962).

PERSON, Clayton Oscar, MA (Saskatchewan), PhD (Alberta), Professor and Head Department of Genetics (1961, 1961).

PETERSEN, Thomas Alfred, BSc (Alberta), MA (Washington State), Assistant Professor and Agricultural Supervisor for Extension (1963, 1963).

PETERSON, Allan Wallace, MSc (Alberta), Associate Professor of Civil Engineering (1953, 1959).

PHIBBS, Edgar, MA (Cambridge), Associate Professor of Mathematics (1947, 1952).

PHILLIPS, David Lloyd Garrick, MD (Alberta), Instructor in Psychiatry (1955, 1955).

PHILLIPS, Ronald Edward, BSc (Alberta), Associate Professor of Electrical Engineering and Superintendent of Buildings (1942, 1963).

PILKINGTON, Wilfred, MA BEd (Alberta), Associate Professor of Secondary Education and Assistant Dean (1952, 1957).

PINOLA, Rudolph, BA (Minnesota), MS PhD (Wisconsin), Associate Professor in Faculty of Commerce (1964, 1964).

POCKLINGTON, Thomas Carey, BA (Toronto), PhD (Indiana), Assistant Professor of Political Science (1961, 1961).

POIRIER, Richard, BA MD (Montreal), Lecturer in Paediatrics (1948, 1956).

PORTEOUS, John Wardlaw ,MSc (Alberta), Professor of Electrical Engineering (1930, 1955).

POUNDER, James Rudsdale, MA (Toronto), Associate Professor of Mathematics (1955, 1962).

POWRIE, Thomas Lawrence, BSA MA (Saskatchewan), DPhil (Oxford), Associate Professor of Economics (1959, 1964).

PRAGNELL, Bartley R., Dip (Winnipeg School of Art), Dip (School of Art and Design, Montreal), Assistant Professor of Art (1963, 1963).

PRESTON, Thomas Alexander, MA (Cantab), Associate Professor of Agricultural Engineering (1963, 1963).

PRESTON, William Walford, BSc (Queen's), Associate Professor of Civil Engineering (1938, 1950).

PRICE, George, BA BD (Wales), Assistant Professor of Philosophy (1964, 1964).

PURKIS, Miss Lloane Gayle, BA (Alberta), BLS (British Columbia), Library Assistant (1964, 1964).

PURVIS, Neil MacLean, BSc MEd (Alberta), Associate Professor of Elementary Education (1964, 1964).

QUEHL, Eby, MD (Alberta), MRCOG (London), Lecturer in Obstetrics and Gynaecology (1950, 1955).

QUINLAN, Peter Thomas, BSc MB ChB (Manchester), FRCS (Edinburgh), Instructor in Otolaryngology (1961, 1961).

QUON, Donald, MSc (Alberta), ScD (Massachusetts Institute of Technology), Professor of Chemical Engineering (1949, 1964).

QURESHI, Ahmad H., MA (Panjab), BS MA PhD (Illinois), Assistant Professor of English (1961, 1961).

QURESHI, Saleem M. M., MA (Agra), LLB (Lucknow), PhD (Pennsylvania), Assistant Professor of Political Science (1963, 1963).

RALETICH, Miss Ivana, Lic (Belgrade), MLA (Toronto), Library Assistant (1960, 1960).

RAMSAY, Colin George, BSc (New Brunswick), MD CM (McGill), Instructor in Medicine (1958, 1958).

RAO, Mathukumalli Venkata Subba, MA MSc PhD (Madras), Associate Professor of Mathematics (1963, 1963).

RAYBACK, Joseph G., AM PhD (Western Reserve), Professor of History (1964, 1964).

RAZAVY, Mohsen Modarres, MA (Tehran), PhD (Louisana State), Assistant Professor of Physics (1963, 1963).

READ, Frederick Douglas, BSc DDS (Alberta), Lecturer in Dentistry (1959, 1960).

REES, Donald Leslie, BSc MD (Alberta), Instructor in Surgery (1960, 1961).

REESE, Willard Francis, BS (U.S. Merchant Marine Academy), MA (Colorado State College), Associate Professor of Elementary Education (1960, 1963).

REEVES, Arthur Weir, BA (Alberta), MA Chicago), EdD (Stanford), Professor and Head of Educational Admisistration (1956, 1956).

REGAN, John Owen, BA (McMaster), MEd (Buffalo), Assistant Professor of Secondary Education (1963, 1963).

REID, David William James, BSc MD (Alberta), FRCS(C), Instructor in Obstetrics and Gynaecology (1961, 1963).

REINHOLD, Ernest, BSc MA (Alberta), PhD (Michigan), Associate Professor of German and Head of Germanic Languages, Linguistics (1952, 1959).

REMPEL, Peter P., BA BEd (Saskatchewan), PhD (Minnesota), Associate Professor of Psychology and Acting Director and Senior Counsellor of Student Counselling Services (1959, 1964).

RENNER, Miss Ruth Olive Ann, MSc (Alberta), PhD (Cornell), Associate Professor of Household Economics (1960, 1963).

RENTIERS, Paul Louis, BA MD (Alberta), MSc (Minnesota), Assistant Clinical Professor of Dermatology (1964, 1964).

REVELL, Miss Grace Aileen, RN (Alberta), Infirmary Nurse (1935, 1935).

RICHARD, Harold Lane, MD (Alberta), FRCS(C) FACS, Assistant Clinical Professor of Surgery (1939, 1962).

RIEDEL, Bernard Edward, MSc (Alberta), PhD (W. Ontario), Executive Assistant to the Vice-President and Professor of Pharmacy (1946, 1961).

RITCHIE, Douglas Campbell, BSc MD (Alberta), FACS DABOG, Assistant Clinical Professor of Obstetrics and Gynaecology (1949, 1962).

RITTER, Robert Arthur, MSc (Saskatchewan), PhD (Alberta), Associate Professor of Chemical Engineering (1955, 1960).

ROBBINS, Stuart George, Dip Phys Ed (St. Luke's, Exeter), Lecturer, Physical Education (1964, 1964).

ROBBLEE, Alexander Robinson, MSc (Alberta), PhD (Wisconsin), Professor of Poultry Nutrition (1945, 1957).

ROBERTSON, Gordon Raymond, DDS (Alberta), Lecturer in Dentistry (1959, 1959).

ROBERTSON, Howard Stephen, BA (McMaster), AM PhD (Indiana), Associate Professor of French (1963, 1963).

ROBERTSON, James Alexander, MSc (Manitoba), Associate Professor of Soil Science (1955, 1964).

ROBINSON, Donald Baker, MASc (British Columbia), PhD (Michigan), FCIC, Professor and Head of Chemical and Petroleum Engineering (1948, 1959).

RODKIEWICZ, Czeslae Mateusz, DipIng (Polish Unviersity College), MS (Illinois), Associate Professor of Mehanical Engineering (1958, 1964).

RODIN, Alvin E., MSc MD (Manitoba), Instructor in Pathology (1961, 1962).

RODMAN, Floyd Silas Beverley, MSc (Saskatchewan), PhD (Minnesota), MD (Alberta), Assistant Clinical Professor of Medicine (1948, 1955).

ROLLINS, Bryce, BCom (Alberta), CA, Associate Professor of Commerce (1961, 1964).

ROLSTON, Thomas, LRCM (London), Associate Professor of Music (1958, 1963).

ROSE, Edward Joseph, AM (Brooklyn), PhD (Toronto), Associate Professor of English (1958, 1964).

ROSS, Colin Andrew, MD (Alberta), FRCS(C), Instructor in Surgery (1954, 1954).

ROSS, Donald Murray, MA (Dalhousie), PhD (Cambridge), Professor and Head of Zoology (1961, 1961).

ROSSALL, Richard Edward, BSc MB ChB MD (Leeds), MRCP FRCP(C), Assistant Professor of Medicine (1957, 1960).

ROSTRUP, Olav, MD (Alberta), FACS FRCS(C), Clinical Professor of Orthopaedic Surgery (1939, 1957).

ROTHROCK, George Abel, BA (Delaware), MA PhD (Minnesota), Associate Professor of History (1964, 1964).

ROUSELL, Murray Alexander, BCom (McGill), CA, Chief Accountant (1946, 1963).

ROWLAND, Elizabeth Frances, OTR, Lecturer in Physical and Occupational Therapy (1961, 1961).

ROYCE, Joseph, AB (Denison), PhD (Chicago), Professor and Head of Psychology (1960, 1960).

ROZEBOOM, William Warren, BS PhD (Chicago), Associate Professor of Psychology (1964, 1964).

RULE, Mrs. Brendan Gail, BA (Riverside), MA (Santa Barbara), PhD (Washington), Part-time Assistant Professor of Psychology (1964, 1964).

RULE, Stanley Jay, BA (Redlands), MA PhD (U. of Washington), Assistant Professor of Psychology (1962, 1962).

RUNQUIST, Willard Nelson, AB (Redlands), MA PhD (Northwestern), Associate Professor of Psychology (1962, 1962).

RUSSELL, Phyllis, BA (Alberta), BLS (Toronto), Medical Librarian (1958, 1959).

RUTH, Royal Francis, BA (Grinnell), MSc PhD (Wisconsin), Associate Professor of Zoology (1961, 1964).

RYAN, Aylmer Arther, MA (Alberta), Professor of English, Provost, Executive Assistant to the President (1940, 1962).

RYAN, John Martin, BSc (St. Francis Xavier), MD CM (Dalhousie), Lecturer in Medicine (1958, 1964).

SADLER, Gerald Wesley, BSc (Saskatchewan), MSc (Illinois), Associate Professor of Mechanical Engineering (1947, 1959).

SAFFEL, Arnold Oscar, BCom (Alberta), MBA (W. Ontario), CA, Associate Professor of Commerce (1957, 1961).

ST. CLAIR, William Roy, MB ChB (Edinburgh), MRCP (Edinburgh), Instructor in Medicine (1956, 1956).

ST. JOHN, Henry Clinton, BA (San Jose State College) MA (Stanford), Assistant Professor of Secondary Education (1962, 1962).

SALT, Walter Raymond, MSc (Alberta), Professor of Anatomy (1949, 1958).

SAMPLE, John Thomas, MA PhD (British Columbia), Associate Professor of Physics (1958, 1961).

SAMUEL, George, MA (Glasgow), Associate Professor of French, Administrator of Professional Exams (1948, 1956).

SAMUEL, George, MA (Alberta), Lecturer in English (1963, 1963).

SAMUELS, Harold Louis, BSc DDS (Alberta), Assistant Professor of Operative Dentistry (1948, 1952).

SANDERS, James, BA (Toronto), MA (Queen's), PhD (Syracuse), Associate Professor of Mathematics (1963, 1963).

SCHAARSCHMIDT, Gunther, Lecturer in Russian (1963, 1963).

SCHIFF, Harry, MSc PhD)McGill), Professor of Physics and Chairman of the Department (1953, 1964).

SCHMID, Gerhard M., PhD (Innsbruck), Assistant Professor of Chemistry (1962, 1962).

SCHNELL, Mrs. Natalie, BSc (Alberta), Assistant Dietitian (1959, 1959).

SCHONBAUM, Gregory Richard, BSc PhD (London), Associate Professor of Biochemistry (1962, 1964).

SCHRAG, Astor Ralph, MD (Alberta), Assistant Clinical Professor of Psychiatry (1945, 1956).

SCHUMACHER, Miss Marguerite Eva, BSc (Western Reserve), MA (Columbia), Adviser to Schools of Nursing (1958, 1958).

SCHWYZER, Hubert R. G., BA (Reading), MA (Berkeley), Assistant Professor of Philosophy (1963, 1964).

SCOTT, Miss Alison Pettigrew, MA BLitt (Oxford), PhD (Queen's), Associate Profesosr of German (1959, 1964).

SCOTT, Donald Burton, BA (Toronto), PhD (McGill), Professor of Physics and Director of Computing Centre (1940, 1960).

SECORD, David C., DVM (Ontario Veterinary College), MVSc (Toronto), Assistant Professor ond Director of the Vivarium (1961, 1961).

SELINGER, Zelig, MD (Montreal), Instrutcor in Psychiatry (1954, 1954).

SEREDA, Mitro Mike, MD (Alberta), Lecturer in Medicine and Assistant Professor of Pathology (1938, 1960).

SHANDRO, William Alexander, MD CM (McGill), FRCS(C), Lecturer in Surgery (1943, 1953).

SHARMA, Ambikeshwar, MA (Agra), PhD (Lucknow), Associate Professor of Mathematics (1962, 1962).

SHARPLIN, Mrs. Janet, BSc PhD DIC (London), Lecturer in Entomology (1960, 1963).

SHAW, James Albon, BS (Houston), MA (Indiana), Assistant Professor in Extension (1963, 1963).

SHAW, Miss Margaret, BSc (Alberta), Manager of Food Services (1963, 1963).

SHEININ, Saul Solomon, MA PhD (Toronto), Assistant Professor of Physics (1962, 1962).

SHERBANIUK, Douglas John, BA LLB (Alberta), LLM (Columbia), Associate Professor of Law (1955, 1960).

SHERBANIUK, Richard William, BSc MD (Alberta), Infirmary Physician and Instructor in Medicine (1954, 1960).

SHERMAN, Ludwik, MB (Poznan), Lecturer in Medicine (1955, 1964).

SHNITKA, Theodor Khyam, MSc MD (Alberta), Associate Professor of Pathology (1954, 1962).

SIEGENBERG, Joe, BSc MB BCh (Witwatersrand), MSc (Alberta), FRCS (England), FRCS(C), Sessional Instructor in Surgery (1963, 1963).

SIGURDSON, Solberg Einar, BSc (Manitoba), MA (Toronto), PhD (Wisconsin), Assistant Professor of Secondary Education (1964, 1964).

SILLS, Royal Cleveland, DDS (Alberta), Lecturer in Prosthetic Dentistry (1955, 1955).

SIMMONDS, Sidney Herbert, MSc (Alberta), PhD (Illinois), Associate Professor of Civil Engineering (1957, 1963).

SINCLAIR, Roy George Gunn, BSc (Alberta), PhD (Massachusetts Institute of Technology), Assistant Professor of Mathematics (1960, 1960).

SINCLAIR, Stewart Ronald, MSc (Alberta), Professor and Head of Civil Engineering (1945, 1959).

SINNEMA, William, BSc (Alberta), MSc (Illinois), Assistant Professor of Electrical Engineering (1961, 1961).

SITWELL, Oswald Francis George, BA (Oxon), MA (Toronto), Assistant Professor of Geography (1964, 1964).

SKOROPAD, William Peter, MSc (Alberta), PhD (Wisconsin), Associate Professor of Plant Pathology (1959, 1961).

SLAVUTYCH, Yar, AM PhD (Pennsylvania), Assistant Professor of Slavonic Languages (1960, 1960).

SMALL, George Roger, BA MA (Saskatchewan), MA (Toronto), Instructor in Physics 1963, 1963).

SMILLIE, Keith William, BA (W. Ontario), MA PhD (Toronto), Associate Professor of Computing Science (1963, 1963).

SMILLIE, Lawrence Bruce, BCc (McMaster), MA PhD (Toronto), Associate Professor of Biochemistry (1955, 1957).

SMITH, Alan Arthur, MMus (Toronto), Associate Professor of Elementary Education (1957, 1960).

SMITH, Alexander, QC BA LLB (Alberta), JSD (Stanford), Professor of Law (1947, 1950).

SMITH, Douglas Elstow, MA (Queen's), PhD (Harvard), Professor of Psychology and Dean of Arts (1937, 1958).

SMITH, Miss Joan Iris, BEd (Alberta), Instructor in Physical Education (1963, 1963).

SMITH, Murray Frank Robert, BEd (Alberta), Associate Professor of Physical Education (1958, 1964).

SMITH, Peter John, MA (New Zealand), Associate Professor of Geography (1959, 1964).

SMITH, Walter Alvah Samuel, BA (Redlands), MA PhD (Pennsylvania), Associate Professor of Psychology and Assistant Dean of Arts (1962, 1964).

SMITH, Warren Edward, MSc (Alberta), PhD (Nebraska), Associate Professor of Genetics and Plant Breeding (1947, 1955).

SMITH, Wiliam Donald, BPHE (Toronto), MA (Columbia), EdD (Buffalo), Professor of Physical Education (1947, 1958).

SOROKIN, Mrs. Lois Adeline, BA BLS (Toronto), Librarian, Extension (1962, 1962).

SOWTON, Ian Charles, MA (Toronto), Associate Professor of English (1956, 1963).

SPANER, Sidney, BA MD (Alberta), Clinical Professor of Psychiatry (1948, 1955).

SPARBY, Harry Theodore, BSc MA (Alberta), PhD (Stanford), Professor of Educational Administration (1946, 1956).

SPARLING, Mrs. J. Grant, BA DipSW (Toronto), Dean of Women (1960, 1960).

SPEAKMAN, Thomas John, MSc (McGill), MD (Manitoba), FRCS(C) FACS, Assistant Clinical Professor of Surgery and Honorary Lecturer in Physiology (1951, 1956).

SPEARMAN, Donald, MA (McGill and Montreal), PhD (Montreal), Associate Professor of Psychology (1948, 1955).

SPENCER, Mrs. Eileen, BA (Saskatchewan), MA (Bryn Mawr), PhD (California), Professor of Plant Science and Biochemistry (1953, 1964).

SPERBER, Geoffrey Hillard, BSc BDS (Witwatersrand), MS (Rochester), Assistant Professor of Dentistry (1961, 1961).

SPRAGUE, Walter Howard, PhC (Alberta), Instructor in Pharmacy (1945, 1945).

SPROULE, Brian Ralph Jessup, MSc MD (Alberta), FRCP(C), Assistant Professor of Medicine (1960, 1960).

SPURR, Mrs. Barbara Roxana, BA (Alberta), BLS (Toronto), Library Assistant (1962, 1962).

STANG, Edwin A., DDS (Alberta), Lecturer in Dentistry (1962, 1962).

STANGELAND, Robert Alan, BMus (Ohio), MMus (Rochester), Associate Professor of Music (1959, 1964).

STARCHUK, Orest, LicJur et RerPol, DrJur et RerPol (Chernowitz), Associate Professor of Russian and Head of Slavonic Languages (1949, 1958).

STEEN, William Irwin Maurice, DDS (Alberta), Lecturer in Operative Dentistry (1958, 1958).

STEIN, Richard Adolph, BSc (Alberta), MSc (Illinois), Assistant Professor of Electrical Engineering (1961, 1961).

STELCK, Charles Richard, MSc (Alberta), PhD (Stanford), Professor of Geology (1946, 1957).

STEPHANSON, Barney Thorvardur, BE (Saskatchewan), MSc (Minnesota), Associate Professor of Agricultural Engineering (1946, 1951).

STEPHENS, Herbert Henry, MD (Alberta), Lecturer in Medicine (1950, 1950).

STEWART, Allan Greenwood, MA (Queen's), PhD (W. Ontario), Instructor in Medicine and Associate Professor of Paediatrics (1953, 1958).

STEWART, Duncan Russel, DDS (Alberta), Associate Professor of Prosthetic Dentistry (1946, 1954).

STOBBE, Miss Ellenora, Sessional Instructor in Clinical Pathology (1958, 1960).

STONEHAM, Joel, BHE MHN (New Hampshire), Director of Food Services (1964, 1964).

STRAUSZ, Otto P., Lic (Eotvos Lorand, Budapest), PhD (Alberta), Assistant Professor of Chemistry (1963, 1963).

STRELIOFF, Mac G., DDS (Alberta), MS (Columbia), Lecturer in Dentistry (1962, 1962).

STROMSMOE, Keith Allan, BSc (Alberta), MSc (New Brunswick), Assistant Professor of Electrical Engineering (1963, 1963).

STRUTZ, Walter Alan, BA (Saskatchewan), MD (Alberta), FRCS(C), Instructor in Surgery (1957, 1957).

STUART, Robert Douglas, MB ChB MD DSc DPH (Aberdeen), FRCP (Glasgow), Professor and Head of Bacteriology and Director of Provincial Laboratory of Public Health (1949, 1950).

SUCHOWERSKY, C. N., D Iur et Rer Pol (Czernowitz), MLS (Washington), Library Assistant (Cataloguing), (1960, 1960).

SWALLOW, Miss Kathleen, BSc MD (Alberta), Assistant Clinical Professor of Paediatrics (1953, 1959).

SWALLOW, Robert James, BA (Saskatchewan), MD (Alberta), Associate Professor of Pathology (1961, 1964).

TAIT, Robert James, BSc (Glasgow), Assistant Professor of Mathematics (1962, 1962).

TAUZER, George M., BSc (Abilene Christian College), Director of Student Housing (1963, 1963).

TAYLOR, Harry William, MSc PhD (Manitoba), Associate Professor of Physics (1961, 1961).

TAYLOR, Jack Dean, MSc (Alberta), PhD (Saskatchewan), Assistant Professor of Pharmacology (1957, 1960).

TAYLOR, John Benjamin, OACA (Toronto), Associate Professor of Art (1947, 1958).

TAYLOR, Stanley, MA (Toronto), PhD (Chicago), Associate Professor of Sociology (1962, 1962).

TAYLOR, William Clyne, MB ChB (Aberdeen), FRCP(C), Associate Profsesor of Paediatrics and Honorary Instructor in Pathology (1957, 1959).

TEDESCHINI, Mario Isidor, BSc MD (Alberta), Instructor in Paediatrics (1957, 1962).

TENNESSEN, Herman, Magister Artium (Oslo), Associate Professor of Philosophy (1961, 1961).

THEMAN, Adolph Edward, MD (Manitoba), FRCS(C), Lecturer in Surgery (1957, 1963).

THOMAS, Lewis Gwynne, MA (Alberta), PhD (Harvard), Professor and Head of History (1938, 1958).

THOMAS, Lewis Herbert, MA (Saskatchewan), PhD (Minnesota), Associate Professor of History (1964, 1964).

THOMPSON, Andrew Cecil, BSc DDS (Alberta), Sessional Instructor in Prosthetic Dentistry (1960,1960).

THOMPSON, Andrew Royden, LLB (Manitoba), LLM (Toronto), Professor of Law (1950, 1963).

THOMPSON, Donald Neil, BCom (Manitoba), MBA (Berkeley), Assistant Professor of Commerce (1962, 1962).

THOMPSON, Robert Kenneth Colquhoun, BSc MD (Alberta), FACP ,Clinical Professor of Medicine (1939, 1950).

THOMSON, Keith Heathcote, MA BEd (Alberta), EdD (California), Associate Professor of Educational Foundations (1960, 1960).

THOMSON, Stanley, BASc (Toronto), MSc (Alberta), Associate Professor of Civil Engineering (1961, 1963).

TOOGOOD, John Alfred, BSc (Alberta), PhD (Minnesota), Professor and Head of Soil Science (1948, 1959).

TOOMBS, Wilbert Nelson, BEd BA (Saskatchewan), MEd (British Columbia), Assistant Professor of Educational Administration (1962, 1962).

TOOP, Edgar Wesley, BSA (British Columbia), MSc PhD (Ohio State), Assistant Professor of Plant Science, (1962, 1962).

TOSHACH, Miss Sheila, BScHEc (Alberta), MA (Toronto), Assistant Professor of Bacteriology (1957, 1957).

TOWNSEND, Edith Edgecombe, MSc PhD (McGill), Assistant Professor of Biochemistry (1962, 1962).

TRETIAK, Salomea, BA (Manitoba), MA (Columbia), Assistant Professor of Nursing (1961, 1961).

TRIANTAPHYLLOPOULOS, Demetrios, MD (Athens), Associate Professor of Physiology (part-time) (1958, 1963).

TROLLOPE, John Reginald, MSc PhD (Alberta), Assistant Professor of Mathematics (1964, 1964).

TUBA, Jules, MSc (Saskatchewan), PhD (Toronto), Professor of Biochemistry (1942, 1952).

TUCKER, Gordon Neil, MD (Toronto), Lecturer in Surgery (1938, 1948).

TURNER, George Godfrey, BA (McGill), LLB (British Columbia), BLS (Toronto), Assistant Librarian (1964, 1964).

URSCHEL, Albert R., DDS (Alberta), Lecturer in Dentistry (1958, 1958).

VAN ALSTINE, Robert Stacey, DDS (Alberta), MS (Michigan), Associate Professor and Head of Surgery-Periodontia (1953, 1961).

VANDEN BORN, William Henry, MSc (Alberta), PhD (Toronto), Assistant Professor of Plant Science (1961, 1961).

VANDER WELL, Allen Richard, MA (Iowa), Counsellor in Student Counselling Services, Assistant Professor of Educational Psychology (1960, 1960).

VAN NGUYEN, Thuan, BA (Nguyen Khuyen), MA (New Mexico), MS (Stanford), Assistant Professor of Electrical Engineering (1962, 1962).

VAN VLIET, Maurice Lewis, MS (Oregon), EdD (California), Dean, Faculty of Physical Education (1945, 1964).

VENART, James E. S., BSc (Toronto), Assistant Professor of Engineering (1964, 1964).

VERSCHUREN, Jacobus Petrus, Ir (Delft), Associate Professor of Civil Enginering (1954, 1961).

VOICE, Miss Margaret I., BA (Alberta), BLS (Toronto), Library Assistant (1963, 1963).

VOSS, Walter Arthur Geoffrey, BSc PhD (London), Associate Professor of Electrical Engineering (1964, 1964).

VOZOFF, Keeva, BS (Minnesota), MSc (Pennsylvania State), PhD (Massachusetts Institute of Technology), Asociate Professor of Physics (1958, 1962).

WALKER, Bernal Ernest, MA (Alberta), PhD (Stanford), Professor and Head of Educational Foundations (1947, 1961).

WALKER, George Brown, MA (Glasgow), PhD (London), Professor and Head, Electrical Engineering (1964, 1964).

WALKER, George William Rutherford, MA (Saskatchewan), PhD (McGill), Associate Professor of Genetics (1954, 1958).

WALLEY, Roc Edward, AB PhD (Berkeley), Assistant Professor of Physiology (1963, 1963).

WARD, Mrs. Josephine Hendry, RN (Alberta), Assistant Infirmary Nurse (1946, 1946).

WARE, Robert Livingston, MMusEd (Southern Mississippi), Assistant Professor of Elementary Education (Music) (1964, 1964).

WARWARUK, Joseph, BSc (Alberta), MS PhD (Illinois), Associate Professor of Civil Engineering (1960, 1962).

WATSON, Mrs. Sheila Martin, MA (British Columbia), Assistant Professor of English (1961, 1962).

WATSON, Wilfred, BA (British Columbia), MA PhD (Toronto), Associate Professor of English (1951, 1957).

WEBSTER, Gordon Ritchie, MSA (British Columbia), PhD (Oregon), Associate Professor of Soil Science (1960, 1963).

WECKOWICZ, Tadeusz Eugenieus, MBChB (Polish School, University of Edinburgh), DPM (Leeds), PhD (Saskatchewan), Assistant Professor of Psychology and Psychiatry (1963, 1963).

WEICHMAN, Frank Ludwig, BS (Brooklyn), PhD (Northwestern), Associate Professor of Physics (1958, 1963).

WEIJER, Jan, MSc PhD (Groningen), Professor of Genetics (1957, 1960).

WEINLOS, Chaim Harry Wolf, BA MD (Alberta), FRCS(C), Lecturer in Surgery (1949, 1963).

WEIR, Mary S., BSc (Glasgow), PhD (Berkeley), Assistant Professor of Chemistry (1962, 1963).

WEIR, Norman William Ferguson, MB ChB (Belfast), BOA MRCOG, Honorary Sessional Instructor in Obstetrics and Gynaecology (1958, 1958).

WENSEL, Ronald Harvey, BSc, MD (Alberta), FRCP(C), Instructor in Physiology and Medicine (1964, 1964).

WHIDDEN, John MacLean, BCom (Alberta), Bursar (1947, 1947).

WHITE, Miss Alison Genevieve, EdB (Eastern Illinois), AM (Ohio), MA (Bread Loaf), PhD (State University of Iowa), Associate Professor of English (1955, 1961).

WHITELEY, William Henry, BA (Brit. Columbia), AM (Queen's), PhD (Cornell), BLS (McGill), Periodicals Librarian (1963, 1964).

WHITING, Robert Harvey, BA (Toronto), MD CM (McGill), FACP FRCP(C), Associate Clinical Professor in Medicine (1947, 1964).

WHITNEY, Eoin, BSc (Alberta), AM PhD (Harvard), Associate Professor of Mathematics and of Computing Science (1957, 1959).

WHYTE, James Howden, BSc (Edinburgh), MSc PhD (McGill), Professor of Botany, Director of the Botanical Garden and Field Laboratory (1939, 1958).

WICKENDEN, John Nicholas, BA (Alberta), BA (Cantab.), Assistant Professor of History (1962, 1963).

WIEDNER, Donald Lawrence, BA (Colgate), AM PhD (Harvard), Assistant Professor of History and Chairman of History (1961, 1964).

WIEDRICK, Laurence George, BA (Saskatchewan), BLS (Toronto), BEd (Alberta), Assistant Professor of Elementary Education (School Libraries), (1964, 1964).

WILLETT, Douglas Warren, BS (S. Dakota School of Mines), Assistant Professor of Mathematics (1962, 1962).

WILLIAMS, C. Brian, BCom (British Columbia), MBA (Washington), Assistant Professor of Commerce (1964, 1964).

WILLIAMS, Henry Thomas Gee, MB ChB (Liverpool), FRCS (England), FRCS(C), Assistant Clinical Professor in Surgery (1958, 1964).

WILLIAMSON, Colwyn T. J., BA (Leeds), Assistant Professor of Philosophy (1962, 1963).

WILLIS, Jackson Norman, BA (Manitoba), MSW (McGill), Sessional Instructor in Preventive Medicine (1962, 1962).

WILLOX, George Leslie, MD (Alberta), FRCS(C) FACS, Clinical Professor of Surgery (1951, 1957).

WILSON, Donald Robert, BA (Oxford), MD CM (McGill), FRCP(C), FACP, Professor and Head of the Department of Medicine (1947, 1954).

WILSON, Gordon Lochead, MD (Alberta), Lecturer in Orthopaedic Surgery (1947, 1956).

WILSON, LLewellyn, L., BA (Washington), MA (Northwestern), Assistant Professor of Elementary and Secondary Educaton (1961, 1961).

WILSON, Miss Lolita Nevon, MA (British Columbia), Asociate Professor of Psychology (1951, 1959).

WILSON, Thomas Charles, MD CM (Queen's), Lecturer in Otolaryngology (1958, 1959).

WILSON, Thomas Sidney, BSc (New Brunswick), MD (Toronto), FRCS(C) FACS, Clinical Professor of Surgery (1949, 1954).

WINCH, David Monk, BSc PhD (London), Associate Professor of Economics (1960, 1963).

WINDLE, Stanley Charles, BSc MD (Manitoba), Lecturer in Radiology (1963, 1964).

WINTER, George Robert, BSc (Alberta), MSc PhD (Iowa State), Associate Professor of Agricultural Economics (1963, 1963).

WISHART, Robert Barry, BCom (Toronto), Administrator of Student Awards (1959, 1959).

WOHLFARTH, Harry, DFA (Bonn), Hon PhD (Marconi), FIAL, Extension Assistant Professor of Art (1954, 1958).

WONDERS, William Clare, BA PhD (Toronto), MA (Syracuse), Professor and Head of Geography (1953, 1957).

WONG, James Sui-Wing, BSc (Baylor), PhD (California I.T.), Assistant Professor of Mathematics (1964, 1964).

WOOD, Miss Betty Joan, MD (Manitoba), Instructor in Radiology (1961, 1962).

WOOD, John David, MA (Toronto), Assistant Professor of Geography (1962, 1962).

WOOD, Franklin William, MSc (Alberta), Associate Professor of Dairy Science (1946, 1961).

WOODS, Stuart Brownlee, MA (Saskatchewan), PhD (British Columbia), Associate Professor and Assistant Chairman, Department of Physics (1959, 1959)

WOODSWORTH, Joseph Gowanloch, BA BEd (Alberta), EdD (Stanford), Professor and Head of Educational Psychology (1951, 1963).

WORTH, Walter Holmes, MEd (Alberta), EdD (Illinois), Professor and Head of Elementary Education (1955, 1961).

WRIGHT, Gerald Howard, BA (Sir George Williams), Assistant Professor in Extension (1963, 1963).

WYMAN, Max, BSc (Alberta), PhD (California Institute of Technology), FRSC, Professor of Mathematics and Vice-President (1943, 1964).

YAKE, W., BA (Saskatchewan), MD (Alberta), Sessional Instructor in Preventive Medicine, 1963, 1963).

YAMAMATO, Tatuso, MSc (Alberta), PhD (Yale), Assistant Professor of Microbiology (1962, 1962).

YATES, Edward Norman, AOCA (Toronto), Associate Professor of Arts (1954, 1964).

YONEDA, Yoshitaro, MD (Alberta), FRCS(C) FACS, Assistant Clinical Professor of Obstetrics and Gynaecology (1955, 1962).

YONGE, Keith Arnold, MD CM (McGill), DPM (London), Professor and Head of Psychiatry (1957, 1957).

YOUDELIS, William Vincent, BSc (Alberta), MEng PhD (McGill), Associate Professor of Metallurgy (1958, 1963).

YOUNG, McLean Kenneth, MD (Alberta), Lecturer in Medicine (1949, 1964).

YULE, David Lloyd George, BA (British Columbia), MA (Toronto), Associate Professor of Extension (1954, 1954).

YUODELIS, Ralph A., DDS (Alberta), Lecturer in Dentistry (1958, 1958).

ZALESKY, Nicholas, MD (Prague and Lwow), Lecturer in Medicine (1954, 1959).

ZALIK, Saul, BSA MSc (Manitoba), PhD (Purdue), Professor of Plant Science (1952, 1964).

ZIEL, Henry Richard, BSc (N.Y. State College), MS (Cornell), EdD (Wayne State), Professor and Head of Industrial and Vocational Education (1962, 1962).

ZINGLE, Harvey Wilfred, MEd (Alberta), Assistant Professor of Educational Psychology (1964, 1964).

HONORARY STAFF MEMBERS

BAKER, Kenneth, MB ChB MD (Liverpool), FRCS(C) MRCOG, Honorary Sessional Instructor in Obstetrics and Gynaecology.

BLAIS, The Honourable Aristide, BS MD (Laval), FACS, Honorary Professor of Clinical Surgery.

CAIRNS, His Honor Judge Laurance Yeomans, QC, BA LLD (Alberta), Honorary Professor of Law.

CAMPBELL, Venus Joseph, MD (Alberta), Honorary Instructor in Medicine.

CHENARD, Miss Imelda, RN MSc (Laval), Honorary Assistant Clinical Professor of Psychiatry (1958, 1961).

DAY, Allan, MB (Toronto), Honorary Clinical Professor of Obstetrics and Gynaecology.

DOUGALL, R. Henry, BAcc (Saskatchewan), BSc MD (Alberta), Honorary Instructor in Medicine.

ELLIS, Gordon Nicholas, BA MD CM (Queen's), Honorary Clinical Professor of Urologic Surgery.

FORD, The Honorable Frank, QC, BCL (Trinity) DCL (Toronto), LLD (Alberta and Laval), Honorary Professor of Law.

GANS, Leo John, BSc MD (Alberta), Honorary Sessional Instructor in Obstetrics and Gynaecology.

GILLESPIE, John Cuthbert, Honorary Sessional Instructor in Preventive Medicine.

HALL, Morton Eldred, BA MB (Toronto), Honorary Associate Professor of Pathology.

HAMILTON, Thomas Rochester, BSc MB ChB (Durham), MRCS (England), Honorory Sessional Instructor in Preventive Medicine.

HUCKELL, Robert Graham, MD CM (McGill), FAAOS, FACS, Honorary Clinical Professor of Orthopaedic Surgery.

HUSEL, Donald Harold, BSc MD (Alberta), Honorary Sessional Instructor in Obstetrics and Gynaecology.

JIMENEZ, José, MD (Madrid), Honorary Lecturer in Rehabilitation Medicine.

JUDGE, David Lawrence Crawford, BSc MD (Alberta), FRCP(C), Honorary Instructor in Medicine.

KYLE, William Donald, BSc MD (Alberta), Honorary Sessional Instructor in Anaesthesia.

MACAULAY, William Donald, BSc (New Brunswick), MD CM (McGill), Honorary Sessional Instructor in Medicine.

McINTYRE, John William, MD (London), DA FFARCS (England), Honorary Instructor in Anaesthesia.

MacLEAN, Randall Roberts, MD (Alberta), Honorary Lecturer in Psychiatry.

McPHAIL, William Grant, MD (Manitoba), Honorary Sessional Instructor in Preventive Medicine.

MARTLAND, The Honorable Mr. Justice Ronald, BA LLB (Alberta), BCL (Oxford), Honorary Professor of Law.

MICHIE, Thomas Campbell, MD (Alberta), Honorary Associate Clinical Professor of Psychiatry.

MOYER, Donald John, MD (W. Ontario), Honorary Sessional Instructor in Obstetrics and Gynaecology.

PARISH, James Gordon, MB ChB MD (Edinburgh), DPM (RCPandS England), Honorary Lecturer in Rehabilitation Medicine.

PEARCE, Mrs. I. Elizabeth, BA MSc PhD (W. Ontario), Honorary Pesearch Associate in Genetics.

PURCELL, Miss M. Geneva, RN, BN (McGill), MS (Boston), Honorary Lecturer in Nursing.

QUIGLEY, William Arthur, DDS LDS (Toronto), MS (Michigan), Honorary Professor of Orthodontics.

SCRAGG, Richard Dennison, BSc MD (Alberta), Honorary Instructor in Pharmacology.

SNELL, Bernard, LRCP LRCS DPH MRCP (Edinburgh), LRFP&S (Glasgow), Honorary Instructor in Preventive Medicine.

SOPER, Joseph Dewey, LLD (Alberta), Honorary Research Associate in Zoology.

SPRAGUE, Percy Harry, MD (Alberta), MS (Minnesota), FACP, Honorary Associate Professor of Clinical Medicine.

STEER, George Hobson, QC, MA (Queen's), LLD (Alberta and Queen's), Honorary Professor of Law.

TOWNSEND, Robert Gordon, BSc (Saskatchewan), MD CM (McGill), Honorary Sessional Instructor in Surgery.

VARVIS, Christopher James, BSc MD (Alberta), MSc (McGill), Honorary Instructor in Medicine.

WASS, Douglas Keith, BA MSW (Toronto), Honorary Sessional Instructor in Preventive Medicine.

WEIR, Norman William, MB BCh BAO (Belfast), MRCOG, Honorary Sessional Instructor in Obstetrics and Gynaecology.

WILLIAMS, Henry Thomas Gee, MB ChB (Liverpool), FRCS (England), FRCS(C), Honorary Lecturer in Surgery.

WILLIS, Jackson Norman, BA BSW MSW (McGill), Honorary Sessional Instructor in Preventive Medicine.

EMERITI

PRESIDENT EMERITUS

ROBERT NEWTON, M.C., B.S.A., M.Sc., Ph.D., D.Sc., LL.D., F.A.I.C., F.R.S.C.

PROFESSORS EMERITUS

ALEXANDER RUSSELL MUNROE, M.D., C.M. (McGill), F.A.C.S., F.R.C.S(C); Professor Emeritus of Surgery.

CECIL SCOTT BURGESS, F.R.I.B.A., F.R.A.I.C.; Professor Emeritus of Architecture.

HARRY ERNEST BULYEA, D.M.D. (Harvard), LL.D. (Manitoba); Professor Emeritus of Operative Dentistry.

JOHN MALCOLM MacEACHRAN, M.A., Ph.D. (Queen's and Leipzig), LL.D.; Professor Emeritus of Philosophy.

EDGAR STANSFIELD, M.Sc. (Manchester); Research Professor Emeritus.

ROBERT STARR LEIGH WILSON, B.Sc. (McGill); Professor Emeritus of Civil and Municipal Engineering.

JOHN PERCY SACKVILLE, B.S.A. (Toronto), M.S. (Iowa); Professor Emeritus of Animal Science.

EDOUARD SONET, M.A. (Alberta), Docteur d'Universitè (Rennes); Professor Emeritus of Modern Languages.

ARDREY WHIDDEN DOWNS, M.A. (Philadelphia), M.D. (Pennsylvania), D.Sc. (McGill), F.A.A.A.S., F.A.C.P.; Professor Emeritus of Physiology and Pharmacology.

JAMES ROBERT FRYER, M.A. (Toronto), Ph.D. (California); Professor Emeritus of Plant Science.

OLIVE MARGARET FISHER, M.A. (Stanford), Ph.B. (Chicago), LL.D. (Alberta); Associate Professor Emeritus of Education.

ROBERT KAY GORDON, B.A. (Oxon.), M.A., Ph.D. (Toronto). F.R.S.C.; Professor Emeritus of English.

GOLDWIN SMITH LORD, M.A., LL.D. (Mt. Allison); Professor Emeritus of Education.

ROBERT McLEOD SHAW B.A. (Dalhousie), M.D., C.M., D.P.H. (McGill), F.R.C.P.(C); Professor Emeritus of Bacteriology.

ROBERT JAMES LANG, B.A. (McMaster), M.A., Ph.D. (Toronto), F.A.A.A.S., F.A.P.S., F.R.S.C.; Professor Emeritus of Physics.

MILTON EZRA LAZERTE, B.A. (Toronto), M.A., B.Ed. (Alberta), Ph.D. (Chicago); LL.D. (Alberta); Professor Emeritus of Education.

MORDEN HEATON LONG, B.A. (McMaster), B.A. (Alberta), M.A. (Oxon), F.R.S.C.; Professor Emeritus of History.

JOHN MACDONALD, M.A., D.Litt. (Edinburgh); Professor Emeritus of Philosophy.

FRANCIS OWEN, M.A. (Toronto), Ph.D. (Chicago); Professor Emeritus of Modern Languages.

KARL ADOLPH CLARK, M.A. (McMaster), Ph.D. (Illinois); Professor Emeritus of Metallurgy.

HEBER CARSS JAMIESON, M.B. (Toronto), F.R.C.P.(C); Professor Emeritus of Clinical Medicine.

EVAN GREENE, M.D., C.M. (McGill), F.R.C.S. (Edinburgh), F.A.C.S.; Professor Emeritus of Anatomy.

HOWARD HAVELOCK HEPBURN, M.C., M.D., C.M. (McGill), F.R.C.S. (Edinburgh), F.A.C.S., F.R.C.S.(C); Professor Emeritus of Surgery.

HERBERT EDGAR SMITH, B.A. (Illinois), M.A., M.Ed. (Alberta), Ph.D. (California); Professor Emeritus of Education.

PERCIVAL SYDNEY WARREN, B.A. (Toronto), A.R.C.S. (London), Ph.D. (Toronto), F.R.C.S.; Professor Emeritus of Geology.

MABEL PATRICK, B.A. (Toronto), M.A. (Columbia); Professor Emeritus of Household Economics.

LAWRENCE HOWARD NICHOLS, B.A. (McGill), M.A. (Alberta), F.R.Met.S.; Professor Emeritus of Physics.

MALCOLM ROSS BOW, B.A., M.D., C.M. (Queen's), D.P.H. (Toronto); Professor Emeritus of Preventive Medicine.

DOUGLAS BURROWS LEITCH, M.C., B.A., M.D. (Toronto), F.R.C.P.(C); Professor Emeritus of Paediatrics.

WILLIAM SCOTT HAMILTON, D.D.S. (Toronto), F.A.C.D., F.D.S.R.C.S. (England); Professor Emeritus of Oral Surgery.

HAROLD RAY THORNTON, B.Sc. (Alberta), Ph.D. (Wisconsin); Professor Emeritus of Dairy Science.

EVANGELINE ALBERTA HASTIE, B.A. (Toronto); Associate Professor Emeritus of Physical Education.

JOHN WILLIAM SCOTT, M.D., C.M. (McGill), F.R.C.P.(C), F.A.C.P.; Professor Emeritus of Medicine.

JOHN EDLESTON BOWSTEAD, M.Sc., Ph.D. (Wisconsin); Professor Emeritus of Animal Husbandry.

HUGH ALTON MacGREGOR, B.Sc. (Alberta), M.Sc. (Cornell), Ed.D. (Oregon State College); Professor Emeritus of Education.

MARK ROBERT MARSHALL, M.M., M.D., C.M. (McGill), D.L.O. (England), F.R.C.S.(C), F.A.C.S.; Professor Emeritus of Ophthalmology.

RALPH FAUST SHANER, Ph.B. (Lafayette), Ph.D. (Harvard), F.R.S.C.; Professor Emeritus of Anatomy.

ALEXANDER JOSEPH COOK, B.Sc. (Alberta), M.A. (Harvard), Ph.D. (Chicago), Professor Emeritus of Mathematics.

WILLIAM DEWAR McDOUGALL, M.A. (Alberta), Ed.D. (Columbia), Professor Emeritus of Education.

MAIMIE SHAW SIMPSON, M.Sc., M.Ed., (Alberta), Professor Emeritus of Education.

HAZEL McINTYRE, B.Sc (Alberta), M.S. (Ames), Professor Emeritus of Household Economics.

ARTHUR WELLESLEY CAMPBELL HENRY, M.S.A. (Saskatchewan), Ph.D. (Minnesota), Professor Emeritus of Plant Science.

JOHN DAWSON NEWTON, B.S.A. (McGill), Ph.D. (California), Professor Emeritus of Soil Science.

ERNEST SYDNEY KEEPING, B.Sc., A.R.C.S. (London), D.I.C., Professor Emeritus of Mathematics.

ANDREW LEO DOUCETTE, B.Sc. (Dalhousie), M.A. (Alberta), D.Ed. (Stanford), Professor Emeritus of Education.

JOHN ROSS VANT, B.A. (Saskatchewan), M.D. (Manitoba), F.A.C.S., F.A.C.O.G., F.R.C.S.(C), F.R.C.O.G., Professor Emeritus of Obstetrics and Gynaecology.

HERBERT EDWARD RAWLINSON, M.D. (Alberta), M.Sc., Ph.D. (McGill); Professor Emeritus of Anatomy.

SPERRY DAVID FRASER, D.D.S. (Alberta), F.A.C.D.; Professor Emeritus of Prosthetic Dentistry.

JOHN THOMAS JONES, M.A. (Alberta and Oxford), Professor Emeritus of English.

REUBEN BENJAIMAN SANDIN, M.A. (Alberta), Ph.D. (Chicago), F.R.S.C., Professor Emeritus of Chemistry.

WILLIAM GEORGE HARDY, M.A. (Toronto), Ph.D. (Chicago), F.I.A.L., Professor Emeritus of Classics.

HUGH GRAYSON-SMITH, M.B.E., M.A., Ph.D. (Toronto), F.R.S.C., Professor Emeritus of Physics.

JAMES ALFRED HARLE, M.Sc. (Durham), M.I.E.E., Professor Emeritus of Electrical Engineering.

POST-DOCTORAL FELLOWS

Bacteriology

MARTIN, Philip, M.D., Ph.D. (U.C.L.A.), July 1964-July 1965.

Biochemistry

FURKA, Arpad, Ph.D. (Szeged), September 1964-September 1965.

Chemistry

BALLE, Gerhard, Ph.D. (Bonn), April 1964-April 1965.

BEER, Andreas, Ph.D. (Darmstadt), January 1964-January 1965.

NAYAK, Ullal Govindraj, Ph.D. (Indian Institute of Science), September 1963-September 1964.

TARR, Andrew M., Ph.D. (Wales), October 1963-September 1965.

YARWOOD, Anthony John, Ph.D. (Birmingham), April 1964-November 1964.

Civil Engineering

RAJARATNAM, Nallamuthu, Ph.D. (Indian Institute of Science), August 1963-August 1965.

Dairy Science

DESAI, Indrajit D., Ph.D. (Davis), Decemhber 1964-December 1965.

Mining and Metallurgy

SCOWEN, Reginald V., Ph.D. (Bristol), October 1963-October 1965.

Theoretical Physics Institute

CHATTERJEE, Ramanendra, Ph.D. (Calcutta), October 1963-October 1965.

ORMAN, Bryan A., Ph.D. (London), September 1964-September 1965.

SAKAMOTO, Y., Ph.D. (Kyoto), October 1964-October 1965.

Zoology

JANDE, S. S., Ph.D. (Panjab), September 1964-September 1965.

SALEUDDIN, Abu Saber Mohammed, Ph.D. (Reading), August 1964-August 1965.

THE UNIVERSITY, CALGARY

(The University issues its own Calendars)

Councils, Administration and Academic Staff

The duties and powers of the President, the Deans' Council, the General Faculty Council and the Faculty Councils are similar to those attributed earlier to the President and the respective Councils of the University at Edmonton; and the membership of the Councils is similarly constituted.

THE PRESIDENT

Herbert Stoker Armstrong, M.A., Ph.D.

THE DEANS' COUNCIL

THE GENERAL FACULTY COUNCIL

President Armstrong
Dean H. S. Baker
Dean T. M. Penelhum

Professors—Challice, Davis, T. G. Finn, Gibb, Goodwin, Heymann, Lindstedt, MacNeish, S. J. Nelson, Neville, Peck, Winspear, Woodsworth

Associate Professors—Anderson, Cheal, Churchley, Guy, Hartland-Rowe, Hyne, Inlow, Mills, Nelson, Oliver, Oyler, Schonfield

John Nicol, Registrar, Secretary of the Council

FACULTY COUNCILS

Arts and Science

President Armstrong
Dean Penelhum

Professors—Challice, Davis, Goodwin, Heymann, Lindstedt, MacNeish, S. J. Nelson, Neville, Peck, Winspear

Associate Professors—Al Salam, R. N. Anderson, Anton, Armstrong, Baker, A. F. Brown, A. M. Brown, Buckmaster, Edginton, Engelmann, Greig, Guy, Hartland-Rowe, Henshaw, Hyne, Inlow, Krueger, Lakshmikantham, Lambert, Lancaster, Magee, Mills, Mitchell, J. G. Nelson, Oetting, Oliver, Oyler, Parsons, Pease, Prescott, Prince, Reed, Schonfield, Self, Sharma, Shimrat, Smeaton, Stadelbauer, Terentiuk, B. G. Wilson, Zentner

Assistant Professors—F. C. Adam, Alexander, P. K. Anderson, Anger, Ashwell, Bird, Breugelmans, Cox, Doolittle, Forbis, Harms, Losie, Newbery, Shields, Simony

The Registrar, Calgary

Education

President Armstrong
Dean Baker
Dean Coutts

Professors—T. G. Finn, Gibb, Lindstedt, Woodsworth

Associate Professors—Aikenhead, R. N. Anderson, A. F. Brown, A. M. Brown, Cheal, Eccles, S. G. Finn, Gandy, Guy, King, Lambert, Linton, Mills, Newton, Norris, Roden, Shields, Stadelbauer, Storey, Terentiuk

Assistant Professors—Frost, Macintosh

Dr. S. C. T. Clarke, representative of the Alberta Teachers' Association
Miss Ryder, Librarian
The Registrar, Calgary

ADMINISTRATIVE OFFICERS

President—Herbert Stoker Armstrong, M.A., Ph.D., F.R.S.C.
Dean of the Faculty of Arts and Science—Terrence Michael Penelhum, M.A., B.Phil.
Assistant to the Dean—G. Rodney Morisset, B.Ed., M.A.
Dean of the Faculty of Education—Harold Stewart Baker, M.A., Ph.D.
Assistant Dean of the Faculty of Commerce—William Anthony Preshing, B.A., B.Ed., M.B.A.
Chairman, Division of Engineering—Adam M. Neville, M.Sc., Ph.D., A.M.I.C.E., A.M.I. Struct.E.
Secretary, Division of Engineering—H. Russell McArther, B.A.Sc., M.A., D.L.S.
School of Physcal Education—Luther G. Goodwin, M.A., B.Ed., M.Ed., Ph.D.
Director of the Summer Session and of the Evening Credit Program—Theophilus George Finn, B.A., A.M., Ed.D.
Director of Student Counselling Services—Eugene Richard Oetting, M.S., Ph.D.
Registrar—John Nicol, M.A.
Business Officer—
Accountant—Allen Francis Crumb, B.Com., R.I.A.
Director Student Health Services—Donald Lauchlin McNeil, M.D., F.R.C.P.(C), F.A.C.P.
Nursing Director, Student Health Services—Aileen Patricia Huff, B.Sc.
Director of Extension—Robert Stanley Chapman, M.Ed.
Dietitian—Donna Christie, B.H.E.
Superintendent of Buildings and Grounds—John Authur Webb, B.Sc.
Adviser to Men Students and Administrator of Student Awards—Paul R. Adams, B.A., M.Sc.

ACADEMIC STAFF

(INSTRUCTIONAL AND ADMINISTRATIVE)

Compiled June, 1964

ADAM, F. C., BA MSc (British Columbia), PhD (Washington), Assistant Professor of Chemistry (1958, 1958).
ADAM, I. W., BA (Alberta), MA (London), Assistant Professor of English (1960, 1960).
ADAM, June, BA PhD (Sydney), Assistant Professor of Psychology (1962, 1964).
ADAMS, Paul R., BA MSc, Adviser to Men Students and Administrator of Student Awards (1964, 1964).
AHUJA, J. C., MA (Banaras Hindu), PhD (British Columbia), Assistant Professor of Mathematics (1963, 1963).
AIKENHEAD, J. D., BSc (Manitoba), AM (Chicago), EdD (Oregon), Associate Professor of Educational Administration (1950, 1954).
ALEXANDER, Jean A., BA (Oregon), MA PhD (Washington), Assistant Professor of English (1962, 1962).
ALLINGHAM, Mrs. M. L. P., BA (W. Autsralia), BLS (Toronto), Library Assistant (1963, 1963).
AL-SALAM, W. A., BSc MA (Berkeley), PhD (Duke), Asssociate Professor of Mathematics (1964, 1964).
ANDERSON, P. K., AB (Cornell), MS (Tulane), PhD (California), Assistant Professor of Biology (1961, 1961).
ANDERSON, R. N., BA BEd (Saskatchewan), MA PhD (Minnesota), Associate Professor and Head of Educational Foundations (1959, 1963).
ANGER, Clifford D., MA PhD (California), Assistant Professor of Physics (1962, 1962).
ANTON, F. R., BSc (Econ), PhD (London), MA (UCLA), Associate Professor of Economics (1957, 1962).
ARAI, Hisao P., AB (UCLA), PhD (UCLA), Assistant Professor of Biology (1963, 1963).
ARAI, Mary N., BSc (New Brunswick), MA (Toronto), PhD (UCLA), Research Associate of Biology (1963, 1964).
ARMSTRONG, D. A., BSc PhD (McGill), Associate Professor of Chemistry (1958, 1963).
ARMSTRONG, Herbert S., MA (Toronto), PhD (Chicago), FRSC, Professor of Geology and President (1964, 1964).
ASHWELL, I. Y., DLC (Loughborough), BA MA PhD (Bristol), Assistant Professor of Geography (1962, 1962).
BACHELOR, F. W., BS (Berkeley), PhD (MIT), Assistant Professor of Chemistry (1963, 1963).

BAKER, H. S., BA (Toronto), MA (Alberta), PhD (Columbia), Dean of Education (1947, 1962).

BAKER, W. P., MA (Texas Christian), MA (Tulane), PhD (Harvard), Associate Professor of English (1964, 1964).

BEATON, Mary A., BSc MEd (Alberta), Assistant Professor of Curriculum and Instruction (1959, 1959).

BELLETTE, A. F., BA (Tasmania), MA (British Columbia), Lecturer in English (1963, 1963).

BENN, M. H., BSc PhD (London), Assistant Professor of Chemistry (1961, 1961).

BETZ, H., Akad Uebersetzer Diplom-Dolmetscher (Heidelberg), Assistant Professor of Economics (1963, 1964).

BIRD, C. D., BSc (Manitoba) MSc PhD (Oklahoma State), Assistant Professor of Biology (1962, 1962).

BLACK, A. J., MA (Alberta), Lecturer in English (1964, 1964).

BLAKESLEE, C. D., BA (Kansas), MS PhD (S. Illinois), Assistant Professor of Sociology and Anthropology (1964, 1964).

BLANK, S. S., MA (British Columbia), PhD (California), Assistant Professor of Educational Psychology (1963, 1963).

BOUDREAU, J., MA PhD (UCLA), Assistant Professor of History (1962, 1962).

BOWERING, G. H., MA (British Columbia), Lecturer in English (1963, 1963).

BRATTON, R., BSc (Sir George Williams College), MSc (UCLA), Assistant Professor of Physical Education (1961, 1964).

BRESKY, D., Ju Dr (Prague), MA PhD (Washington), Assistant Professor of Modern Languages (1962, 1962).

BREUGELMANS, R., LPhil et Lettres DPhil et Lettres Agrégé (Ghent), Assistant Professor of Modern Languages (1961, 1961).

BROOKS, J. B., BA (New Hampshire), MA (Pennsylvania State), Assistant Professor of English (1962, 1962).

BROWN, A. F., BA BPed (Manitoba), MEd PhD (Alberta), Associate Professor of Educational Administration (1961, 1964).

BROWN, A. M., LRSM (London), BMus (Montreal), EdD (Florida State), Associate Professor and Head of Fine Arts and Fine Arts Education (1964, 1964).

*BUCKMASTER, H. A., BSc (Alberta), MA PhD (British Columbia), Associate Professor of Physics (1957, 1961).

BURGESS, G. D., BA (Saskatchewan), MSc (McGill), Sessional Lecturer in Biology (1960, 1962).

BUTCHER, Theresa M., BA (Montreal), BLS (Toronto), Library Assistant (1964, 1964).

CAIRNS, A. T. J., MA (Alberta), Lecturer in English (1962, 1962).

CARRIER, Lois, BA (Saskatchewan), BLS (Toronto), Reference-Circulation Librarian (1955, 1962).

CARSWELL, R. J. B., BA (British Columbia), MAT (Florida), Assistant Professor of Curriculum and Instruction (1964, 1964).

CHALLICE, C. E., BSc PhD (London), ARCS DIC FinstP, Professor and Head of Physics (1957, 1963).

CHALLIS, Lorna M., BA (Dunelm), BA (London), Lecturer in English (1961, 1962).

CHAPMAN, Robert Stanley, MEd (Alberta), Associate Professor of Extension (1963, 1964).

CHEAL, J. E., MEd (Alberta), LRSM (London), ARCT (Toronto), PhD (Chicago), Associate Professor and Head of Educational Administration (1958, 1963).

CHORNY, M., MEd (Alberta), Assistant Professor of Curriculum and Instruction (English) (1960, 1960).

Clark, T. A. Sessional Lecturer in Physics (1963, 1964).

COOMBES, C. A., BA PhD (Berkeley, Assistant Professor of Physics (1963, 1963).

COOPER, R. M., BA MA (Manitoba), PhD (McGill), Assistant Professor of Psychology (1964, 1964).

COULSON, M. R. C., BA (Durham), MA (Kansas), Assistant Professor of Geography (1963, 1963).

COX, D., BSc (London), MA (Leicester), Assistant Professor of Political Science (1963, 1963).

CROSS, M. S., MA (Toronto), Assistant Professor of History (1964, 1964).

CRUMB, A. F., BCom (Alberta), RIA, Accountant (1963, 1963).

DAVIDSON, P. O., MA (Alberta), PhD (Queen's), Assistant Professor of Psychology (1964, 1964).

DAVIS, A. K., AM PhD (Harvard), Professor of Sociology and Anthropology (1964, 1964).

dePAIVA, H., BS (Alberta), MS PhD (Illinois), Associate Professor of Division of Engineering (1961, 1964).

DE COURSEY, R., BA MM (Oregon), Assistant Professor of Fine Arts and Fine Arts Education (1964, 1964).

DE JUBECOURT, G. S., Assistant Professor of Modern Languages (1964, 1964).

deVRIES, B., BSc (Royal Agricultural College, Boskoop), Sessional Lecturer in Biology (1963, 1963).

DEWAR, J. D., BEd (Alberta), MA (Ohio State), Assistant Professor of Physical Education (1961, 1961).

DODD, E. M., BA DipEd (Durham), MA (Ohio State), Assistant Professor of Fine Arts and Fine Arts Education (1960, 1960).

*DOIGE, A. G. BE MSc (Saskatchewan), Assistant Professor of Mechanical Engineering (1960, 1960).

DOOLITTLE, Q. D., BS (Ithaca College), MM (Indiana), AMD (Rochester), Assistant Professor of Fine Arts and Fine Arts Education (1960, 1960).

DOUGHERTY, J. P., BA (St. Louis), MA PhD (Pennsylvania), Assistant Professor of English (1962, 1963).

DUQUETTE, Shirley A., BS (Cincinnati), Assistant Professor of Physical Education (1959, 1963).

ECCLES, P. J., BS MS EdD (Illinoins), Associate Professor of Curriculum and Instruction (1960, 1964).

EDGINGTON, E. S., BS MS (Kansas State), PhD (Michigan State), Associate Professor of Psychology (1963, 1963).

ENGELMANN, F. C., AB AM (UCLA), MA PhD (Yale), Associate Professor of Political Science (1962, 1964).

ERIKSON, C. T., BA (Toronto), AM (Harvard), Assistant Professor of Modern Languages (1964, 1964).

FATHI, A. D., BA (American University, Beirut), MA PhD (Washington), Assistant Professor of Sociology and Anthropology (1964, 1964).

FATI, A. D., BA (Beirut), BA (American University, Beirut), MA PhD (Washington), Assistant Professor of Sociology and Anthropology (1964, 1964).

FENYVESI, Constance, BSc MSc (Alberta), Sessional Lecturer in Mathematics (1963, 1963).

FINN, S. G., MA (Colorado), PhD (Iowa), Associate Professor of Fine Arts and Fine Arts Education (1961, 1964).

FINN, T. G., BA (Alberta), AM EdD (Stanford), Professor of Curriculum and Instruction and Director of Summer Session and Evening Credit Program (1947, 1961).

FORBES, R. L., BSc MSc (Alberta), Lecturer in Mathematics (1962, 1963).

FORBIS, R. G., BA MA (Montana State), PhD (Columbia), Assistant Professor of Sociology and Anthropology (1961, 1963).

*FROST, B. P., BA (Sydney), MA (Tasmania), PGCE (London), Assistant Professor of Educational Psychology (1961, 1961).

FRY, D. J. I., BSc PhD (Bristol), Assistant Professor of Physics (1964, 1964).

GANDY, W. E., BA MA (Western State College of Colorado), EdD (Stanford), Associate Professor of Curriculum and Instruction (1960, 1964).

GARG, K. M., MSc PhD (Lucknow), Assistant Professor of Mathematics (1964, 1964).

CECEWICZ, G. E., BA (Trinity College, Burlington, Vt.), Lecturer in Modern Languages (1964, 1964).

GIBB, A. A., BSc BEd (Alberta), MA (Toronto), EdD (Stanford), Professor of Curriculum and Instruction (1951, 1964).

GIBSON, D., BA MA PhD (Toronto), Assictant Professor of Psychology (1963, 1963).

*GLOCKNER, P., BSc (McGill), MSc (MIT), Associate Professor of Civil Engineering (1958, 1962).

GOODMAN, J. A., MA (British Columbia), MEd (Harvard), Assistant Professor of Audio-Visual Education (1964, 1964).

GOODWIN, H. T. A., MA (British Columbia), MEd (Harvard), Assistant Professor of Audio-Visual Education (1964, 1964).

GOODWIN, L., BA BEd MEd (Alberta), PhD (Washington), Professor and Head of Division of Physical Education (1961, 1963).

GORDON, D. R., BA (Queen's), MA (Toronto), Assistant Profesosr of Political Science 1963, 1963).

GOVIER, G. W., BASc (British Columbia), MSc (Alberta), ScD (Michigan), Part-time Professor of Engineering (1963, 1963).

GREAVES, A. A., Diploma Spanish Studies (Segovia), BA (Nottingham), Assistant Professor of Modern Languages (1963, 1963).

GREIG, Godon MacKenzie, MA (Edinburgh), BA (Cantab), Associate Professor of Philosophy (1964, 1964).

GRIEVE, Dorothy, BA (Western Ontario), BLS (British Columbia), Library Assistant (1964, 1964).

GUY, E. F., MA (Dalhousie), PhD (Edinburgh), Associate Professor and Head of Department of English (1953, 1963).

HAMILL, L., MS (Syracuse), PhD (Washington), Assistant Professor of Geography (1963, 1963).

HAMPSON, C. C., BA (Alberta), Associate Professor of Education (1952, 1958).

HARMS, A., BA (Saskatchewan), PhD (Colorado), Assistant Professor of Modern Languages (1959, 1959).

HARTLAND-ROWE, R. C. B., BSc PhD (London), Associate Professor and Head of Department of Biology (1959, 1963).

HEINRICH, A. C., BA (New School for Social Research, N.Y.) MEd (Alaska), PhD (Washington), Assistant Professor of Archaeology (1964, 1964).

HENDERSON, Nancy E., BSc (Dalhousie), MSc (Dalhousie), PhD (Toronto), Assistant Professor of Biology (1962, 1962).

HENSHAW, D. G., MASc (Toronto), PhD (Bristol), Associate Professor of Physics (1962, 1962).

HERZ, T., BEd(Mus) (Teachers College, Israel), BM (Israel Academy of Music), MM (Manhattan School of Music), Assistant Professor of Fine Arts and Fine Arts Education (1962, 1964).

HEYMANN, F. G., PhD (Dr rer pol) (Frankfurt), Professor and Head of Department of History (1959, 1963).

HODGKINS, B. J., AM (Michigan State), Assistant Professor of Sociology and Anthropology (1964, 1964).

HOLLAND, A. S. B., BSc (Victoria University, N.Z.), MSc (Montana State), Assistant Professor of Mathematics (1958, 1961).

HUFF, Miss A. P., MSc (Alberta), Nursing Director, Student Health Services (1963, 1963).

HUSTON, J. P. MSc (Alberta), Assistant Professor of Physics (1962, 1962).

HUTCHINSON, B., BEd (Alberta), MEd (Alberta), Visiting Assistant Professor of Educational Foundations (1963, 1963).

HYNE, J. B., BSc, PhD (St. Andrews), Associate Professor and Head of Department of Chemistry (1960, 1963).

*INLOW, E. B., AB (Washington State), MA (Berkeley), PhD (John Hopkins), Associate Professor and Head of Political Science (1961, 1964).

JORDAN, Peter Alex, BA (McMaster), BLS (British Columbia), Library Assistant (1964, 1964).

KAPOOR, Miss Manju, MSc (Delhi), PhD (Manitoba), Assistant Professor of Biology (1964, 1964).

KELLNER, Hazel E., BA (Saskatchewan), BLS (Toronto), Library Assistant, Cataloguing (1963, 1963).

KING, Ethel M., BEd (Alberta), MA PhD (Iowa); Associate Professor of Curriculum and Instruction (1955, 1962).

KITCHEN, H. W., BCom (McGill), BA (Memorial), MEd (Alberta), Assistant Professor of Educational Administration (1964, 1964).

KIYOOKA, H. M., BEd (Alberta), BFA (Manitoba), MA (Michigan State), MFA (Colorado), Assistant Professor of Fine Arts and Fine Arts Education (1961, 1961).

KRUEGER, P. J., MSc (Manitoba), DPhil (Oxford), Associate Professor of Chemistry (1959, 1964).

KUEBER, Eleanor, BPE (British Columbia), Sessional Instructor in Physical Education (1960, 1960).

L'ABBE, Germaine, MA (Queen's), Assistant Professor of Curriculum and Instruction (1959, 1963).

LAIDLAW, W. G., BSc (W. Ontario), MSc (California Tech), PhD (Alberta), Assistant Professor of Chemitsry (1964, 1964).

*LAKSMIKANTHAM, V., MA PhD (Osmania, India), Associate Professor of Mathematics (1963, 1963).

LAMBERT, R. A., MEd PhD (Alberta), Associate Professor of Educational Psychology (1963, 1963).

LANCASTER, P., MSc (Liverpool), PhD (Singapore), Associate Professor of Mathematics 1962, 1962).

LAWSON, R. F., MA PhD (Michigan), Assistant Professor of Educational Foundations (1963, 1963).

LAYSON, W. W., BS (Tennessee), Visiting Professor of Political Science.

LEIPER, Jean M., BPE (British Columbia), Assistant Professor of Physical Education (1963, 1963).

LEPPER, Maurice Gordon Storrar, BSc (London), BLS (British Columbia), Library Assistant (1964, 1964).

LINDSTEDT, S. A., BSc MEd (Alberta), PhD (Wisconsin), Professor and Head of Education Curriculum and Instruction (1955, 1963).

LINTON, T. E., MA PhD (Michigan), Associate Professor of Education (1962,1962).

LOGAN, J. A., BA (Sydney), Lecturer in Psychology (1962, 1962).

LOOV, R. E., BSc (Alberta), MS (Stanford), Assistant Professor of Engineering (1963, 1963).

LOSIE, R. W., BCom (Alberta), CA, Assistant Professor and Administrative Officer of Commerce (1962, 1963).

LUETHY, I. C. E., MA (Berkeley), MA (British Columbia), Assistant Professor of Modern Languages (1963, 1963).

MacNEISH, R. S., BA MA PhD (Chicago), Professor of Archaeology (1963, 1963).

MACINTOSH, D. deF., BEd (Alberta), MS (Washington), Assistant Professor of Physical Education (1958, 1959).

MAGEE, W. H., BA (British Columbia), PhD (Toronto), Associate Professor of English (1962, 1962).

MALYCKY, A., MA (Alberta), PhD (Cincinnati), Assistant Professor of Modern Languages (German) (1964, 1964).

MAMO, P. S., MA (Toronto), Assistant Professor of Philosophy and Classics (1961, 1961).

MASING, U., BA (Clark), MSc (Alberta), Assistant Professor of Geography (1964, 1964).

MEIR, A., MSc PhD (Hebrew University, Jerusalem), Assistant Professor of Mathematics (1963, 1963).

MILLS, D. L., BA (Idaho), MA Stanford), PhD (Stanford), Associate Professor and Head of Sociology and Anthropology (1961, 1964).

MITCHELL, H., BA (Manitoba), MA (Minnesota), PhD (London), Associate Professor of History and Secretary of the Department (1963, 1963).

MORISSET, G. R., BEd (Alberta), MA (London), Lecturer in English, Assistant to Dean of Arts and Science, and Secretary to the Faculty of Arts and Science(1962, 1963).

MUNSAT, S., AB (Cornell), MA (Michigan), Assistant Professor of Philosophy and Classics (1963, 1963).

MYRES, T., MA (Cambridge), MA PhD (British Columbia), Assistant Professor of Biology (1963, 1963).

*McARTHUR, H. R., BASc (British Columbia), MA (Washington), DLS, Associate Professor of Engineering (1954, 1957), Secretary of the Division of Engineering.

McGUGAN, A., MSc (Queen's, Belfast), Assistant Professor of Geology (1962, 1964).

McIVOR, Moira M., BA (Alberta), BLS (British Columbia), Library Assistant (1964, 1964).

McNEIL, D. L., MD (Manitoba), FRCP(C) FACP, Director of Student Health Service (1961, 1961).

NELSON, J. G., BA (McMaster), MA (Colorado), PhD (Johns Hopkins), Associate Professor and Head of Geography (1960, 1964).

NELSON, S. J., MASc (British Columbia), PhD (McGill), Professor of Geology (1954, 1964)

NEVILLE, A. M., MC BSc(Eng) (Queen Mary College, London), MSc PhD (London), AMICE AMIStructE, Professor of Civil Engineering and Chairman of Division of Engineering (1963, 1963).

NEWBERRY, A. C. R., BA (Cambridge), MA (British Columbia), BA PhD (London), Assistant Professor of Mathematics (1963, 1963).

NEWTON, B. M., BSc (Southern California), MA (Chicago), EdD (Missouri), Associate Professor of Curriculum and Instruction (1945, 1955).

NICOL, J., MA (Toronto), Registrar (1961, 1961).

NOBUSAWA, N., MSc PhD (Osaka), Assistant Professor of Mathematics (1962, 1962).

NORRIS, S., BEd (Alberta), MA (Stanford), Associate Professor of Curriculum and Instruction (1956, 1962).

OETTING, E. R., MSc PhD (Wisconsin), Director of Student Councelling Services (1961, 1961).

OGILVIE, R. T., MA (British Columbia), PhD (Washington State); Assistant Professor of Biology (1963, 1963).

OLIVER, T. A. MSc (Manitoba), PhD (UCLA), Associate Professor and Head of Department of Geology (1959, 1963).

OYLER, J. E., MA (Alberta), PhD (Northwestern), Associate Professor and Head of Department of Modern Languages (1960, 1963).

PARSONS, N. R., BSc PhD (Tasmania), MSc (Melbourne), Associate Professor of Physics (1964, 1964).

PEASE, W. H. BA (Williams), MA (Wisconsin), PhD (Rochester), Associate Professor of History (1964, 1964).

PECK, J. E. L., BeC MSc (South Africa), PhD (Yale), Professor and Head of Department of Mathematics (1959, 1963).

PENELHUM, T. M., MA (Edinburgh), BPhil (Oxford), Professor of Philosophy and Dean, Faculty of Arts and Science (1953, 1964).

PHARIS, R. P., BSc (Washington), MForestry DForestry (Duke), Assistant Professor of Biology (Botany) (1964, 1964).

PLOTNICK, A. R. BA (Temple), MA PhD (Pennsylvania), Assistant Professor of Economics (1961, 1961).

PRESCOTT, J., BSc BSc(Hons) (Adelaide), PhD (Melbourne), DPhil (Oxford), Associate Professor of Physics (1961, 1963).

*PRESHING, W. A., BA BEd (Alberta), MBA (Western Ontario), Associate Professor and Assistant Dean of Commerce. (1957, 1962).

PRINCE, A. R., BA (Acadia), BEd (Alberta), MA (Harvard), PhD (Harvard), Associate Professor of Biology (1951, 1955).

RAY, D. E., AB (Texas Christian), PhD (Rice), Assistant Professor of English (1962, 1962).

REED, J. W., BSc (Sydney), MSc (London), Associate Professor of Mathematics (1964, 1964).

REICHENBACH, P. J., BSc MSc (Oregon), Assistant Professor of Physical Education (1963, 1963).

RICHTER, P. D. BFA (Syracuse), MA Columbia), Assistant Professor of Philosophy (1964, 1964).

ROBINSON, T. M., BA (Durham), Assistant Professor of Classics (1964, 1964).

RODEN, A. H., BS (Tulane), PhD (Texas), Associate Professor of Educational Psychology (1964, 1964).

RUSSELL, M. E., BPHE (Toronto), Instructor in Physical Education (1964, 1964).

RYDER, Dorothy E., BA (Brit. Columbia), BLS (McGill), Librarian (1951, 1957).

SCHEFFER, Edith C., BA (British Columbia), BLS (McGill), Library Assistant, Cataloguing (1962, 1962).

SCHONFIELD, A. E. D., MA (Cambridge), Diploma Institute of Psychiatry (London), Associate Professor and Head of Department of Psychology (1957, 1963).

SCHNELL, R. L., BS MEd (Detroit), Assistant Professor of Educational Foundations (1964, 1964).

SCHAER, J., Lehrpatent für Sekundarschulen (Bern), Diplom für das hohere Lehramt (Bern), Assistant Professor of Mathematics (1962, 1962).

SELF, G. MA (McGill), PhD (Chicago), Associate Professor of History (1947, 1955).

SHERIDAN, C. L., MA PhD (Ohio State), Assistant Professor of Psychology (1964, 1964).

SHIELDS, R. A. M., MA (Manitoba), PhD (Pennsylvania), Assistant Professor of History (1960,1960).

SHIMRAT, M., MSc PhD (Hebrew University, Jerusalem), Associate Professor of Mathematics (1961, 1964).

SIMONY, P. S., BSc, MSc (McMaster), PhD (London), Assistant Professor of Geology (1963, 1963).

SKEITH, M. E., BA (Queen's), BLS (McGill), Chief Processing Librarian (1961, 1961).

SMEATON, B. H., AA (San Mateo Junior College), BA MA (Berkeley), PhD (Columbia), Associate Professor of English (1963, 1963).

SMTIH, Helen M., BA (Queen's), BLS (British Columbia), Order Librarian (1962, 1962).

SNIDER, J. G., MS (Idaho), PhD (Stanford), Assistant Professor of Educational Psychology (1960, 1960).

SORENSON, T. S., BSc (Alberta), PhD (Wisconsin), Assistant Professor of Chemistry (1963, 1963).

SPENCE, D. L., AB (Long Beach State), Assistant Professor of Sociology and Educational Foundations (1962, 1962).

STADELBAUER, Helen B., BSc MA (Columbia), Associate Professor of Fine Arts and Fine Arts Education and Administrative Officer, Art Division (1945, 1963).

*STILWELL, W. H., BA (Drake), MA (Toronto), DLS BCLS ALS, Associate Professor of Civil Engineering (1957, 1960).

STOREY, A. G., BA BEd (Saskatchewan), MA MEd (Alberta), PhD (Stanford), Associate Professor of Educational Psychology (1956, 1959).

SWADDLE, T. W., BSc (London), PhD (Leicester), Assistant Professor of Chemistry (1964, 1964).

SWART, Ellie, BA (Alberta), Sessional Lecturer in Philosophy and Classics (1963, 1963).

TAVARES, D. F., AB (Brown), MS (Yale), PhD (Yale), Assistant Professor of Chemistry (1961, 1962).

TAYLOR, M. J. H., BA DipEd (Cardiff), PhD (Birmingham), Assistant Professor of English (1962,, 1964).

TENER, R. H., Dip in Ed MA (British Columbia), PhD (London), Assistant Professor of English (1962, 1962).

TERENTIUK, F., BSc (Alberta), MA PhD (British Columbia), Associate Professor of Physics and Provost (1958, 1964).

THOMSON, Mrs. June G., BA (Alberta), MA (Toronto), BLS (McGill), Periodicals Librarian (1964, 1964).

TOEWS, J. B., AB (Tabor College), MA PhD (Colorado), Assistant Professor of History (1962, 1963).

VENART, J. E. S., BSc (Toronto), Assistant Professor of Mechanical Engineering (1964, 1964).

WEBB, J. H., BSc (Alberta), Superintendent of Buildings and Grounds (1962, 1962).

WEIR, Mary S., BSc (Glasgow), PhD (Berkeley, Assistant Professor of Chemistry (1962, 1963).

WILSON, B. G., BSc (Queen's, Belfast), PhD (National University of Ireland), Associate Professor of Physics (1957, 1960).

WINSPEAR, A. D., BA (Queen's), MA (Oxford), Professor of Philosophy and Classics (1957, 1962).

WOODSWORTH, J. G., BA BEd (Alberta), EdD (Stanford), Professor and Head of Educational Psychology (1951, 1963).

WRIGHT, R. W., BCom (Alberta), Dip in Business Administration (Western Ontario), MA (Alberta), PhD (Manchester), Assistant Professor of Economics (1962, 1962).

YOUNGER, A. H., MASc (British Columbia), PhD (Purdue), Sessional Lecturer in Engineering (1964, 1964).

*ZAITZEFF, S. I., BA MA (Indiana), Lecturer in Modern Languages (1963, 1963).

ZENTNER, H., BA (British Columbia), MA PhD (Stanford), Associate Professor of Sociology (1960, 1962).

The first of the dates in each case is that of first appointment and the second that of attaining the present rank. An asterisk indicates leave of absence.

EMERITI

DOUCETTE, A. L., BSc (Dalhousie), MA (Alberta), DEd (Stanford), Professor Emeritus of Education.

ACADEMIC COSTUME

All gowns are to be of the customary Cambridge shape, i.e., for undergraduates, a gown of black material not falling below the knee with round sleeve cut above elbow; for bachelors, a gown of black material falling below the knee with full sleeve cut to elbow and terminating in a point; for masters, doctors of medicine and doctors of dental surgery a gown of black material falling below the knee with black sleeves with semi-circular cut at bottom.

Hoods are to be of the Oxford pattern, and of spruce green material.

The bachelor's hood is to have a border (1½ inches wide), the master's a full lining, of the color distinctive of the faculty. The M.D. and D.D.S. hoods are to be of the master's pattern.

The faculty colors are:

For Arts (including LL.D.)	White
For Arts and Science (Calgary)	White
For Science	Gold-yellow
For Agriculture	Pale Blue
For Commerce	Silver Gray
For Dentistry	Maroon
For Divinity	Purple
For Education	Royal Blue
For Engineering	Light Green
For Household Economics	Pink
For Law	Scarlet
For Medicine	Crimson
For Nursing (B.Sc.)	Crimson and White
For Pharmacy	Cinnamon
For Physical Education	Royal Blue and Gold

Doctors' gowns (Ph.D., Ed.D., D.Sc. and D.Litt.) are to conform to the Intercollegiate Code in design. They are to be of black material and the velvet trim is to be *Philosophy blue* for the Ph.D., *Education light blue* for the Ed.D., *Science gold-yellow* for the D.Sc and *Letters white* for the D.Litt.. Doctors of Laws are entitled to wear a full-dress scarlet robe faced with white silk.

All doctor's hoods (Ph.D., Ed.D., D.Sc. and D.Litt.) are to conform to the Intercollegiate Code in shape, size and color. They are to be of black material to match the gown, and the full lining is to be of gold satin with a six-inch green satin chevron. The velvet trim distinguishes the four degrees and matches the velvet trim on the gown. There is to be a narrow green piping where the gold lining joins the black material. The LL.D. hood is of scarlet silk and of the Cambridge form and has a full lining of white silk.

All caps are to be of the ordinary black trencher shape with black tassels, with a black velvet cap with gold cord for LL.D. full dress.

THE DEGREE OF BACHELOR OF DIVINITY

By an arrangement with St. Stephen's College, the degree of Bachelor of Divinity is offered by the University to graduates in the Faculty of Arts and Science. Admission to the B.D. program is open only to students who have completed a minimum of one year's study in Theology. The course of study is prescribed by the College and must be approved by the General Faculty Council Committee on the Bachelor of Divinity degree. The number of courses which may be taken extramurally in a winter session is restricted to two. In all courses taken toward the B.D. degree the pass mark is 65%. No supplemental examinations are permitted.

In the case of a student unknown to the Faculty of St. Stephen's College, or one who has allowed considerable time to elapse since taking his theological course, it shall rest with the Committee on the B.D. degree to decide whether, before being accepted as a candidate, he shall be required to take one of the following: (a) some intramural studies, or (b) a preliminary comprehensive examination.

For further information regarding this course, application should be made to the Registrar.

THE UNIVERSITY LIBRARIES

On the Edmonton Campus of the University of Alberta library service is given from four libraries: Rutherford Library, the Cameron Library, the Education Library, and the Physical Sciences Library.

The Rutherford Library building contains the Undergraduate Library and the Law Library. The former consists of a basic collection of 20,000 of the most used books in courses offered to undergraduate students. The books are in the open access main reading room and the closed access reserve reading room. Unsupervised reading rooms are provided for late study in the building. The Law Library is on the first floor and is primarily for the use of students registered in the Faculty of Law.

The main book collection is housed in the Donald Ewing Cameron Library which is intended primarily for the use of senior and graduate students. The first floor is an information centre with the Union Catalogue hall and bibliographic room, the Reference and Periodical Rooms, and the Main Circulation desk. The ground floor houses special services, namely, rare books, micromaterials, documents, maps, and photoservices. The main book collection is arranged on Floors Two to Five as follows: Social Sciences, Humanities, Sciences, and Medical Sciences.

The Physical Sciences Library is located on the ground floor in the north east corner of the Physical Sciences building, and houses a collection of 10,000 volumes for the use of senior students in Chemistry, Mathematics, and Physics.

The Education Library occupies the two-storey east wing of the Education Building, and has a collection of nearly 50,000 volumes relating to education.

The libraries of the University of Alberta in Edmonton contain over 370,000 accessioned volumes, some 100,000 government documents and a growing collection of research materials in microfilms, and subscribe to 4,900 periodicals. The libraries are adding over 40,000 volumes per year.

On the Calgary campus the library occupied a handsome new building in September 1963. This library has a collection of 85,000 accessioned volumes, and in addition collections of documents, and micromaterials; the library subscribes to 1,500 periodcals.

PROFESSIONAL STAFF

Edmonton:

B.B. PEEL, M.A. (Saskatchewan), B.L.S. (Toronto); Librarian to the University.
S. HARLAND, M.A. (Leeds), F.L.A. (England); Assistant Librarian.
GEORGE GODFREY TURNER, B.A. (McGill), LL.B. (British Columbia), B.L.S. (Toronto); Assistant Librarian,
DOROTHY I. HAMILTON, B.A. (Alberta), B.Sc. in L.S. (Washington), A.M.L.S. (Michigan); Rare Books Librarian.
NORMA E. FREIFIELD, B.A. (Alberta), B.L.S. (Toronto); Circulation Librarian.
LILLIAN E. M. LEVERSEDGE, B.A. (Alberta), B.L.S. (Toronto); Order Librarian.
EMMA MacDONALD, B.A. (British Columbia), B.L.S. (Toronto); Applied Science Librarian.
D. NODEN, M.A. (Cantab.), B.L.S. (McGill); Law Librarian.
MOIRA L. ENGLISH, B.A. (British Columbia), M.L.S. (Washington); Education Librarian.
PHYLLIS RUSSELL, B.A. (Alberta), B.L.S. (Toronto); Medical Librarian.
YVONNE FENTON, B.A. (Dunelm), A.L.A. (England); Chief Cataloguer.
W. H. WHITELEY, B.A. (British Columbia), M.A. (Queen's), Ph.D. (Cornell), B.L.S. (McGill); Periodicals Librarian.
MARGARET V. AUXIER, B.A. (Alberta), B.L.S. (Washington); Reference Librarian.
IVANA RALETICH, Lic. (Belgrade), B.L.A. (Toronto); Library Assistant (Science).
MARGARET I. VOICE, B.A. (Alberta), B.L.S. (Toronto); Library Assistant (Medical).
A. KANTAUTUS, B.Com. (Copenhagen), M.L.S. (Washington); First Assistant (Orders)
C. N. SUCHOWERSKY, D. Jur. er Rer. Pol. (Czernowitz), M.L.S. (Washington); Library Assistant (Cataloguing).
P. HANLON, B.A. (Sir Geo. Williams), B.L.S. (McGill); First Assistant (Cataloguing).
FRANCES MIELKE, B.A. (Manitoba), B.L.S. (Toronto); Library Assistant (Education).
HANNA J. BEDNARSKI, M.A. (Warsaw), B.L.S. (McGill); Library Assistant (Circulation).
LEILA L. HOWELL, M.D. (McGill), B.L.S. (McGill); Library Assistant (Cataloguing).
W. HYRAK, D.Jur. (Free Ukrainian University), B.L.S. (McGill); Library Assistant (Reference).
BARBARA SPURR, B.A. (Alberta), B.L.S. (Toronto); Library Assistant (Periodicals).
M. BULMER, B.A. (Sir Geo. Williams), B.L.S. (McGill); Library Assistant (Cataloguing).
SHEILA BERTRAM, B.Sc. (McMaster), B.L.S. (Toronto); Library Assistant (Orders).
S. LASKOWSKI, B.A. (Alberta), B.L.S. (British Columbia); Library Assistant (Cataloguing).
MARGARET FARNELL, B.A. (Alberta), B.S. in L.S. (Simmons); Library Assistant (Reference).
NATALIE LYTWYNEC, Dip. N.Z. (National Library); Library Assistant (Cataloguing).
ELIZABETH A. FOX, B.A. (Alberta), B.L.S. (Toronto); Library Assistant (Cataloguing).
ANN M. LEE, B.A. (Victoria), B.L.S. (British Columbia), Library Assistant (Cataloguing).
GLENDA J. MacINNES, B.A. (British Columbia), B.L.S. (British Columbia); Library Assistant (Orders).
E. G. OLSON, B.A. (Saskatchewan), B.L.S. (McGill); Library Assistant (Cataloguing).
LLOANE G. PURKIS, B.A. (Alberta), B.L.S. (British Columbia); Library Assistant (Cataloguing).
MRS. CAROLINE LUPTON, B.A. (McMaster), B.L.S. (Toronto), Library Assistant.

Calgary:

DOROTHY E. RYDER, B.A. (British Columbia), B.L.S. (McGill); Librarian.
M. ELIZABETH SKEITH, B.A. (Queen's), B.L.S. (McGill); Chief Processing Librarian.
LOIS CARRIER, B.A. (Saskatchewan), B.L.S. (Toronto); Reference-Circulation Librarian.
JUNE G. THOMSON, B.A. (Alberta), M.A. (Toronto), B.L.S. (McGill); Periodicals Librarian.
HAZEL E. KELLNER, B.A. (Saskatchewan), B.L.S. (Toronto); Library Assistant (Cataloguing).
E. CLAIRE SCHEFFER, B.A. (British Columbia), B.L.S. (McGill); Library Assistant (Cataloguing).

HELEN, M. SMITH, B.A. (Queen's), B.L.S. (British Columbia); Library Assistant (Orders).

MARGARET ALLINGHAM, B.A. (Australia), B.L.S. (Toronto); Library Assistant (Reference).

THERESA BUTCHER, B.A. (Montreal), B.L.S. (Toronto); Library Assistant (Cataloguing).

DOROTHY GRIEVE, B.A. in Secretarial Sc (Western Ontario), B.L.S. (British Columbia); Library Assistant (Cataloguing).

P. A. JORDON, B.A. (McMaster), B.L.S. (British Columbia); Library Assistant (Cataloguing).

M. G. A. LEPPER, BSc (London), B.L.S. (British Columbia), Library Assistant (Cataloguing).

MOIRA M. McIVOR, B.A. (Alberta), B.L.S. (British Columbia); Library Assistant (Reference).

DEPARTMENT OF EXTENSION

The purpose of the Department of Extension is to bring the facilities of the University within the reach of every citizen of the Province. To this end it cooperates with individuals and organizations in projects which advance the social, economic and cultural standards of the community.

Staff:

DUNCAN DARROCH CAMPBELL, B.Com., B.A. (British Columbia), M.A. (Alberta); Professor and Director of Extension.

GLEN ALLENBY EYFORD, B.A. (Manitoba), M.A. (Toronto); Associate Professor and Assistant Director.

ERIC WYLD CORMACK, C.G., O.B.E., B.Sc. (Alberta); Assistant Professor.

THOMAS ALFRED PETERSEN, B.Sc (Alberta), M.A. (Washington), Agricultural Supervisor, Assistant Professor.

DONALD ASA BANCROFT, B.Sc., M.A. (Alberta); Assistant Professor in Pubilc Administration.

JOSEPH EDWARD MULLOY, B.A., B.Com (Dublin), C.A.; Assistant Professor in Public Administration.

CHARLES McDONALD LOCKWOOD, B.A. Sc. (Toronto), Dip. Bus. Adm. (Western Ontario); Assistant Professor.

GERALD HOWARD WRIGHT, B.A. (Sir George Williams); Assistant Professor.

ROBERT STANLEY CHAPMAN, B.Ed., M.Ed. (Alberta), Associate Professor, Calgary.

DAVID LLOYD GEORGE YULE, B.A. (British Columbia), M.A. (Toronto); Associate Professor.

MARY I. DODDS, B.Com. (Alberta), M.S. (Columbia); Extension Librarian.

LOIS ADELINE SOROKIN, B.A., B.L.S. (Toronto); Librarian, Extension Library.

JAMES ALBON SHAW, B.S. (Houston), M.S. (Indiana); Assistant Professor.

HARRY WOHLFARTH, D.F.A. (Bonn), Hon. Ph.D. (Marconi); Extension Assistant Professor of Art.

DOUGLAS D. BARRY, A.O.C.A. (Toronto); Extension Assistant Professor of Art.

Evening Classes, Short Courses and Conferences

An important part of the work of the Department of Extension is the arrangement in appropriate centres of a wide variety of non-credit evening classes for the general public. To a large extent, these classes reflect the work and study being done in the regular university classes and in most cases the same professors are engaged in teaching. A broad range of subjects is offered including Modern Languages, Social Sciences, Literature and the Humanities, Management Training, Engineering, Physical Sciences, Household Economics and the Fine Arts. Currently, some three hundred different classes are offered each year, usually on a weekly evening basis over a period of ten to twenty weeks. Throughout the province, some 10,000 adults are engaged as students in this program.

The term 'short course' refers to the relatively brief but intensive courses aranged to suit the special needs and interests of professional, technical and other groups throughout the province. These courses may vary in length from three days to two weeks and, through them, information and special training is provided to the business, professional and industrial community. Subjects offered may be of a highly technical nature peculiar to a particular group or more general in scope as for example, problems in the field of human relations.

The Department of Extension has, for many years, assisted various community groups and voluntary organizations throughout the province to arrange conferences, workshops, seminars related to the educational aims of the organization. Courses held in conjunction with rural and urban organizations have centred on such topics as leadership training, community development, meeting procedures and the administration of organizations. In all of the University's programs of evening classes, short courses and conferences, staff is drawn from the teaching departments of the University and from business and industry.

The development of programs in public affairs is a new addition to the Extension activities of the University. Its purpose is "to increase the ability of adults to form sound, independent and critical judgments on important issues of public policy". Public Affairs programs will include a special series of evening classes, study discussion materials, directed reading programs, conferences and seminars focused on topical issues of local, national and international importance. Through these events, it is hoped to provide a framework within which adults can develop the attitudes, skills, knowledge and perceptions necessary to the making of responsible judgments about important problems facing the nation.

In general, the role of the Department of Extension is to facilitate learning opportunities for adults throughout the province through special courses, classes and consultation. As might be expected, the program of evening classes, short courses and conferences changes to meet the changing needs of interested individuals and organizations.

Public Administration Training Division

The Public Administration Training Division offers instruction in certificate courses in Municipal Administration, Municipal Assessment and School Board Administration of four years' duration. In addition, it is responsible for periodic conference-courses of three days' duration held annually at Banff. The training needs of local government officers are met by the Division through a combination of correspondence instruction and tutorial sessions. The tutorial sessions are held at twelve selected points throughout the province. The program emphasis of the Division changes to meet the changing needs of local government employees. Currently in preparation is a major correspondence-tutorial course in Municipal Accounting.

Fine Arts

A lively society needs a vigorous, artistic and creative element within itself. People, young and old, with an urge to create, find encouragement and stimulation in the program of Continuing Education in the Fine Arts courses offered

through the Department of Extension. Part-time and full-time specialists in painting, music and drama instruct groups in communities throughout the province and offer special encouragement to the individual in all forms of the fine arts.

Classes of instruction in drawing, water color and oil painting are offered at a number of urban and rural centres throughout the province. Intensive short courses, led by instructors of national and international reputation, are offered mid-year in painting and music. In all classes, individual participation is encouraged with a view to raising technical competence and to nurturing an understanding of the essential role of the arts in life.

Extension Library

The Extension Library provides a service to residents of Alberta who have no public library in their communities. A collection of 54,000 volumes gives special emphasis to the fine arts, continuing education, community leadership, business administration and other fields, and also includes recreational reading for children and adults. Books are sent by parcel post to individuals and families and in boxes of forty volumes to small libraries and community groups of all kinds. The library provides an extensive reference and information service, drawing on inter-library loan when necessary. In addition to this general service, the library closely supports Extension courses in a wide variety of subjects with books, reading lists, periodicals.

Special emphasis is put on the development of directed reading programs using library resources available to both individuals and study groups.

Visual Instruction Division

The Visual Instruction Division provides leadership in the development of audio-visual communication in formal and informal education to educators, individuals and community groups.

The Division provides an audio-visual library including 3,554 16 mm. films, 3,225 filmstrips and 900 recordings, both plate and tape. A variety of projections, recording and playback equipment is available as well. A visual communication laboratory within the Division provides a facility for the preparation of graphics materials for communication purposes in education. It is intended to serve not only teaching staff in regular university classes but as well community groups through consultation, demonstration and instruction, and the preparation of inexpensive visual materials for instruction and program purposes.

An audio-visual information reference file maintained by the Division includes information on sources and availability of audio-visual equipment, materials, utilization of various audio-visual materials, in particular teaching and programming situations, developments in educational television and in program learning. This reference service is designed to serve a wide variety of community groups. In addition, instruction in the technique of audio-visual communication in formal courses on the campus and informal courses across the province is provided.

Group Study and Information Services

Albertans have recognized the value of the information service offered by the Department by an ever-increasing use of these services. The Extension Library provides an information service answering questions of general interest. Through the Agricultural Supervisor, innumerable questions from across the province on specialized topics are answered daily. The Supervisor also distributes bulletins and other publications of interest to those involved in agriculture. The Visual Instruction Division also maintains an information service for special requests concerning audio-visual aids and instruction.

The Department has an interest in the organization of study groups in any section in the province. Living Library and Great Books programs are promoted by departmental personnel by means of assistance with the organization of such groups, counselling on conduct of meetings, leadership and supplying study materials. Programs of directed reading and some few correspondence courses are available on request.

THE BANFF SCHOOL OF FINE ARTS AND CENTRE FOR CONTINUING EDUCATION

Established in 1933 as a school in the arts related to the theatre the University's Banff School of Fine Arts and Centre for Continuing Education operates on a year-round basis and enjoys an international reputation. Beautifully situated on Tunnel Mountain overlooking the Bow Valley and the town of Banff it provides an ideal setting and excellent facilities for training in the arts and all types of seminars, workshops, meetings, conferences, etc.

Staff:

THE HONOURABLE SENATOR DONALD CAMERON, M.Sc. (Alberta), LL.D. (British Columbia); Director.
J. C. K. MADSEN, B.Com. (Alberta); Assistant Director—Programs and Promotion.
D. F. BECKER, B.A., B.Sc. (Alberta); Assistant Director—Operations.

The Summer Session

A wide selection of courses in Theatre Arts; Painting; Music; Ballet; Modern Languages; Writing; Handicrafts; Photography and Figure Skating is offered during the ten-week Summer Session extending from mid-June to mid-September. Hundreds of students from across Canada, the United States and abroad attend courses which may be taken for University credit, Banff School certificates or simply for recreation and pleasure. Classes are conducted under the direction of world renowned artists and instructors in an atmosphere that is both challenging and stimulating.

Continuing Education

The Banff School has become one of the leading centres for continuing education and University extension work. Each year groups and organizations numbering in the hundreds hold short courses, conferences, seminars, etc. of from three to four days' to six weeks' duration. In rceognition of this role in adult education the School was awarded the Henry Marshall Tory Award in 1951 by the Canadian Association for Adult Education.

Business Administration

The School is also the headquarters of the Banff School of Advanced Management, an educational project jointly sponsored by the Universities of Alberta, British Columbia, Manitoba and Saskatchewan. Nearly 1,000 executives from business enterprises all across Canada, the United States and abroad have now graduated from the School. The Banff Centre also conducts a number of annual short courses in specialized fields of management training.

Enquiries

Information regarding courses, facilities, rates, etc. is available on request from the Director, Banff School of Fine Arts and Centre for Continuing Education, Banff, Alberta, Canada.

INDUSTRIAL LABORATORIES

The Department of Industrial Laboratories operates fully equipped chemical and physical laboratories for carrying out analyses and tests on all materials. Industrial investigations can be undertaken.

For complete information and schedule of fees, apply to the Director and Provincial Analyst, Mr. C. E. Noble, B.A., B.Sc., Edmonton.

JUNIOR COLLEGES

By authority of the Co-ordinating Council of the University, junior colleges may be recommended to the Board of Governors for affiliation with the University under the following conditions:

1. **Staff—**
   (a) Number of Staff: A minimum staff of six teachers giving the major part of their time to junior college work must be maintained.
   (b) Qualifications of Staff: The members of the staff should hold at least the Master's degree or its equivalent in the main field of instruction. All staff members offering instruction at the university level must be approved for appointment by the Committee on Junior Colleges of the University of Alberta. (Under the School Act, all staff members offering instruction in High School work must hold teachers' certificates.)

2. **Curriculum—**
   Courses and programs of studies for university credit must be approved by the University Committee on Junior Colleges.

3. **Equipment—**
   Library and laboratory facilities must be adequate in the subjects taught in the junior college.

4. **Admission—**
   The conditions of admission to university courses and programs at junior colleges will be those which obtain in the University of Alberta.

5. **Examinations—**
   The examinations of the junior colleges in courses offered for university credit will be the regular University examinations of the first year.

6. Financial Support—
The University of Alberta assumes no responsibility for the financial support of affiliated junior colleges.

7. Affiliation with Other Institutions—
Junior colleges affiliated with the University of Alberta may not have or enter into affiliations or accreditation arrangements with other colleges or universities without the permission of the Co-Ordinating Council.

8. Period of Affiliation Agreement—
The period of any affiliation agreement shall be five years.

9. Public Announcements—
All documents which an affiliated institution proposes to issue for public information and which purport to contain a statement of the institution's relationship with the university or other universities shall be submitted before printing for the approval of the President of the University.

The teaching staffs of the Junior Colleges affiliated under these regulations are:

Mount Royal College, Calgary:

BEN HUGH BROOKS, M.Sc. (Brigham Young); Instructor in Physical Education.
PETER D. CHIMBOS, B.A. (Great Falls), M.A. (Montana State); Instructor in Sociology.
WILLIAM J. COLLETT, C.D., B.Ed., B.A. (Alberta), M.A. (Columbia), B.D. (Alberta), D.D. (St. Stephens); Principal and Instructor in Psychology.
CHARLES H. COOK, LL.B. (Saskatchewan), M.B.A. (Western Ontario); Instructor in Business Administration.
LUCY J. DYER, B.Sc. (New Brunswick), M.Sc. (Western Ontario); Instructor in Zoology.
M. STANFORD FEADER, C.D., B.A. (Queen's), B.Com. (Ottawa), M.B.A. (Western Ontario); Instructor in Economics and Business Administration.
HENRY M. GUTMAN, B.Com. (Alberta), C.A.; Instructor in Accounting.
JOHN HENRY HASSETT, M.Sc. (British Columbia); Instructor in Physics.
ELLEN JOYCE HORN, M.A. (Manitoba); Instructor in Psychology.
OWEN A. KELLY, M.A. (Alberta); Instructor in English.
JOHN C. KENYON, B.Sc. (Alberta); Instructor in Mathematics.
RALPH W. McCREADY, B.Sc. (Alberta), M.Sc. (Illinois); Instructor in Chemistry.
JAMES A. McKAY, M.A. (Glasgow); Instructor in French.
EDITH ALICE PARK, M.A. (Alberta); Instructor in English.
EDWIN L. PITT, M.A. (Alberta); Instructor in History.
CALBERT B. SELMSER, B.Sc. (Union), M.Sc. (McGill); Instructor in Geology.
EMILY FRANCIS WHITNEY, B.A. (Saskatchewan), M.S.A. (Guelph), M.A. (California); Instructor in Zoology.
ROBERT G. WYCKHAM, B.A. (Waterloo), M.B.A. (Western Ontario); Instructor in Business Administration.

Lethbridge Junior College:

GERALD WILLIAM BOWIE, B.Sc.P.E. (B.Y.U.), M.Sc.P.E. (W.S.U.); Instructor in Physical Educaiton.
ROBERT EARL BULLOCK, B.Sc., M.Sc. (B.Y.U.); Instructor in Zoology, Botany.
WILLIAM JAMES COUSINS, B.A., M.A. (Alberta); Instructor in History and Dean.
ALLEN HARVEY DAHL, B.Sc. (Man.), M.A. (Tor.); Instructor in Physics and Mathematics.
LAURENCE GEORGE HOYE, B.Sc., M.Sc. (Alberta); Instructor in Mathematics.
JOHN PAUL LIEBE, B.A. (Alberta), Ph.D. (Leipzig); Instructor in German.
GEORGE ADOLF MANN B.Ed., M.Ed. (Alberta); Instructor in Education and Sociology.
NICK WILLIAM MYSHOK, B.Ed., M.Sc (Alberta); Instructor in Chemistry.

RUTH FRANCES NADEAU, B.A. (N.B.), B.Ed. (Alberta), Licence (Sorbonne); Instructor in French.

ARTHUR KINGSLEY PUTLAND, M.A. (Alberta), B.Mus., B.Paed. (Tor.); Instructor in Music.

HAROLD OWEN RICKER, B.Com., M.A. (Alberta); Instructor in Business and Economics

WILLIAM HOBART SHARP, B.Sc., M.Sc. (Alberta) Instructor in Botany and Zoology.

AUDREY THOMPSON, R.N., B.Sc (Alberta); Instructor in Nursing.

WILLIAM LEWIS THOMPSON, B.A. (Tor.), M.A. (Stanford); Instructor in Education and Psychology.

PAUL STANLEY UPTON, B.A., M.A. (Alberta); Instructor in English.

MAURICE YACOWAR, B.A., M.A. (Alberta); Instructor in English.

GEORGE HENRY ZIEBER, B.A., B.Ed. (Alberta), M.A. (Toronto); Instructor in Geography.

Camrose Junior College:

D. L. BJORNSON, B.P.E. (Alberta); Instructor in Physical Education.

VINCENT ERIKSSON, B.A. (Saskatchewan), B.D. (Luther Seminary); Instructor in Bible and Philosophy.

MRS. VELMA GOOCH, B.Ed., M.A. (Alberta); Instructor in English.

DONALD G. LEE, B.A., M.A. (Saskatchewan), Ph.D. (British Columbia); Dean and Instructor in Chemistry.

G. LOKEN, B.A. (Alberta); President and Instructor in Educational Administration.

GEORG MOI, B.A. (Alberta), M.A. (British Columbia); Instructor in French.

K. G. MORGENROTH, B.A. (Queen's), M.A., M.Ed. (Saskatchewan), Ph.D. (Milton); Instructor in Psychology and German.

J. R. NEFF, B.Mus. (Concordia College, Minnesota), M.A. (Denver); Instructor in Music.

ORLANDO DUANE OLSON, B.Sc., M.Sc. (Saskatchewan); Instructor in Physics and Mathematics.

ROBERT JONATHAN OSTREM, B.A., M.A. (Hunter College); Instructor in Educational Psychology.

MORLEY RISKE, B.Sc., M.Sc. (Alberta); Instructor in Biology.

DAVID MONK WINCH, B.Sc., Ph.D. (London); Part-time Instructor in Economics.

Red Deer Junior College:

ROBERT BENNETT, M.Sc. (Marshall, W. Virginia); Instructor in Chemistry.

CHARLES CAMPBELL, B.A. (Alberta), M.A. (Toronto), B.Ed., M.Ed. (Alberta); Instructor in English.

NEIL FALKNER, B.Sc. (Manitoba); Instructor in Biology.

GILBERT FARTHING, B.A. (London), M.A., M.Ed. (British Columbia); Instructor in History and Education.

RUTH HILL, B.Ed., M.A. (Alberta), Instructor in English.

LARRY LANG, B.Ed. (Saskatchewan), M.Sc. (Washington); Instructor in Physical Education.

JOHN LONG, B.A., Dip.Ed. (Wales); Instructor in Music.

PETER RAFFA, B.A., B.Ed., M.A. (Alberta); Instructor in Education.

SVENN THORDARSON, D.N.Sc. (Reykjavik); Instructor in Physics.

DONALD WATKINS, B.Ed., M.A. (Alberta); Instructor in French.

AFFILIATED INSTITUTIONS

Certain educational or research organizations in the Province are related to the University either historically, or by resolutions of the University's governing bodies, or for mutual advantage, or in more of these ways than one. The relationship between them and the University is customarily described by the term *Affiliation*. It is a characteristic of such of these institutions as teach or hold examinations that these activities are, in part, directly related to the programs of the University.

THE UNIVERSITY HOSPITAL

The University of Alberta Hospital has a bed capacity of 1,200. The distribution of beds to the various services is fairly uniform. The hospital is administered by a Board appointed by the Lieutenant Governor in Council. Two members of the Board, the President of the University and the Dean of the Faculty of Medicine, are statutory members. Further details may be found in the calendars of the Faculties of Medicine and Dentistry.

From 1922 to 1929 the hospital was administered by the University. Students in Medicine, Dentistry and the degree course in Nursing receive instruction there.

The Hospital Board members are:

D. J. Avison, Esq., Chairman	President Johns
E. A. Christenson, Esq.	Dean MacKenzie
E. A. D. McCuaig, Esq.	G. K. Wynn, Esq.
K. J. Hawkins, Esq.	

The Medical Superintendent is Dr. B. Snell, M.R.C.P., D.P.H.

ST. STEPHEN'S COLLEGE

St. Stephen's College is the Divinity School of the United Church of Canada in the Province of Alberta. Courses are set out below, and in the earlier statement on the Degree of Bachelor of Divinity.

The College erected its first building on the campus in 1910. It provides courses which are accepted for credit towards University degrees, and houses some 150 students.

Its staff includes the following:

REV. EDMUND JABEZ THOMPSON, M.A. (Alberta), B.D., Ph.D. (Chicago), D.D. (United College, Winnipeg); Principal, Professor of Christian Theology and the Philosophy of Religion, The John M. Miller Professor of Practical Theology.

REV. DAVID JOHN CLIFTON ELSON, B.A. (Alberta), M.A. (Columbia), D.D. (St. Andrew's, Saskatoon); Dean, Professor of New Testament Language and Literature.

REV. CHARLES FRANKLIN JOHNSTON, M.A. (McGill), B.D. (U.T.C., Montreal), S.T.M., Th.D. (Union, N.Y.), D.D. (U.T.C., Montreal); Professor of Church History, Librarian, Chaplain of St. Stephen's Residence.

REV. GEORGE LINDSAY VOGAN, B.A., B.D., (Queen's), M.A. (Cambridge); Associate Professor of Old Testament Language and Literature.

REV. CLIFFORD ALLAN STEWART ELLIOTT, B.A. (Saskatchewan), B.D. (St. Andrew's, Saskatoon), S.T.M. (Union, N.Y.), Ph.D. (Columbia), Lecturer in Voice and Homiletics.

REV. TERENCE ROY ANDERSON, B.A., B.D. (Alberta), S.T.M. (Union, N.Y.), Lecturer in Christian Ethics.

Courses of Study

Three Courses of Study are open to Candidates—

1. "The attainment of a B.A. degree, including Greek, to be followed by three years in the study of Theology, is strongly recommended by the Church. Before ordination every candidate shall spend 12 months in preaching and pastoral work."

or

2. "Three years, at least, in Arts, followed by three years in Theology. Before ordination every candidate shall spend 12 months in preaching and pastoral work."

or

3. "Two years' preaching under the supervision of a Presbytery, with appropriate studies, and four years of a mixed Arts and Theological course in College."

Note:—All courses must start from University matriculation.

Suggested Classes in Arts for Students Selecting Course No. 2

(a) English Language and Literature (three years).
(b) Two languages, one of which must be Greek (two years in each).
(c) Philosophy, including psychology, logic and ethics (two years).
(d) Two other subjects from the Arts curriculum at the option of the student (one year in each).

The Arts Course

English Language and Literature; Philosophy, including psychology, logic and ethics; one language; and any one option from the Arts course.

Theological Course

Homiletics; Pastoral Theology; Systematic Theology; New Testament Language and Literature; Old Testament Literature; English Bible; Church History; Christian Ethics and Sociology.

By an arrangement with the University, a course in Biblical Literature is given which is open to students of the University and counts for credit on an Arts course.

Hebrew

George Lindsay Vogan, B.A., B.D. (Queen's), M.A. (Cantab.)

Hebrew offers four courses under the numbers 100, 300, 340 and 400 and is now, with the consent of the Dean of Arts, open to others besides theological students.

Hebrew 100 is the beginners' course. Students who make really good progress may proceed in the second year to Hebrew 340. Those not doing so well will be promoted to Hebrew 300. Hebrew 400 will count as a senior course.

Hebrew 100 or Hebrew 300 or 340 may be offered as Arts options in the first two years, but no student will receive credit for Hebrew 100 until he has subsequently fulfilled the requirements in Hebrew 300 or 340.

Students who do well in the subject may progress through Hebrew 100 and 340 to 400. Weaker students will proceed to Hebrew 100, 300, 340, or 400.

100. Elements of Hebrew (3-0; 3-0)

Basic grammar and selected readings from Ruth and Samuel.

300. Elements of Hebrew Syntax (3-0; 3-0)

Studies in Hebrew grammar and syntax. Readings from the prophets and poets of the Old Testament.
Prerequisite: Hebrew 100.

340. Hebrew Syntax (3-0; 3-0)

All of Hebrew 300, with more extensive reading and more advanced syntax.

400. Advanced Hebrew

A seminar course to be arranged with the professor.
Prerequisite: Hebrew 300 or 340.

ST. JOSEPH'S COLLEGE

This College, established under the authority of the Roman Catholic Church, is directed by the Congregation of St. Basil (Basilian Fathers).

The College was affiliated with the University under an agreement made in 1926. It provides courses which are accepted for credit towards degrees, and houses some 100 students.

Its staff includes the following:

REV. J. WILFRED DORE, C.S.B., M.A. (Toronto), Ph.D. (Ottawa), Rector and Professor of Philosophy.
REV. J. A. SHERIDAN, M.A. (Cantab.), Ph.D., S.T.D. (Gregorian University, Rome), Professor of Christian Apologetics.
REV. R. A. PENDERGAST, C.S.B., B.A.Hons., M.A. (Toronto), Ph.D. (Ottawa), Bursar.

Cooperating with the University, the College offers instruction in the following courses:

Christian Apologetics

366. Christian Apologetics—Father Sheridan (3-0; 3-0)

A doctrinal and apologetical treatment of the key teachings of Christianity; a survey of the New Testament, the History of the Church, and the Encyclicals.

(This course is an Arts option for Roman Catholic students.)

Philosophy

242. Foundations and Development of Christian Philosophy (3-0; 3-0)
Father Dore

THE SOUTHERN ALBERTA INSTITUTE OF TECHNOLOGY

This institution, situated in Calgary and operating under the authority of the Department of Education, was affiliated with the University of Alberta by resolution of the Senate, May 13, 1926.

In addition to courses of the nature implied by its title, it provides instruction in programs leading to the degree of B.Ed. in Industrial Arts.

The Principal is Mr. F. C. Jorgenson, B.Ed.

THE WESTERN BOARD OF MUSIC

This board was founded in 1935 in order to conduct examinations of a high standard in Music. In it are associated the Universities and the Departments of Education of Alberta, Manitoba and Saskatchewan.

The organization in Alberta is under the University Committee on Music, and the University awards the diplomas of A.Mus. (Alberta) and L.Mus, (Alberta) for the second highest and the highest grades, respectively, in the various subjects. Passes in certain examinations of the Board are required of students proceeding towards the degree of Bachelor of Music.

Theoretical and practical examinations are held in Alberta in February and the summer of each year.

Further details, including information about prizes and awards, are to be found in the Music Syllabus, or other official publication obtainable from the Western Board of Music, Department of Fine Arts, University of Alberta.

THE RESEARCH COUNCIL OF ALBERTA

This was formed in 1919 by the Province and the University for the general purpose of conducting economic research into the resources of the Province. For many years it was housed in University buildings. Collaboration between the Council and the University continues in a number of fields. The President of the University is a member of the Council.

The staff of the Council includes the following:

Administrative Officers

E. J. WIGGINS, B.Sc. (Queen's), Ph.D. (McGill); Director of Research.
C. P. GRAVENOR, B.A. (Toronto), M.S. (Wisconsin), Ph.D. (Indiana), F.R.S.C.; Assistant Director of Research and Chief, Earth Sciences Branch.
D. K. IRWIN, B.A. (Western Ontario); Administrative Assistant.
KATHLEEN S. WARK, B.Com. (Alberta); Accountant.
ELEANOR J. SMITHIES, B.A. (Queen's); Library Supervisor.

Fuels Branch

H. W. HABGOOD, M.Sc. (Queen's), M.S., Ph.D. (Michigan); Chief, **Fuels Brnach.**
N. BERKOWITZ, Ph.D. (London); Head, **Coal Division.**
H. M. BROWN, M.Sc. (Alberta); Physicist.
R. A. S. BROWN, B.Sc (Alberta), M.Sc. (California Institute Techonolgy), Ph.D. (Alberta); Engineer.
J. D. CAMPBELL, B.A. (McMaster), M.A. (British Columbia), Ph.D. (McGill); Paleobotanist.
W. DAMMEYER, B.Sc. (Alberta); Chemist.
J. F. FRYER, M.Sc. (Alberta); Chemist.
E. J. JENSEN, M.Sc. (Copenhagen); Engineer.
N. MELNYK, B.Sc. (Alberta); Engineer.
S. MOSCHOPEDIS, B.Sc. (Athens); Chemist.
J. C. WOOD, B.Sc. (Alberta), Ph.D. (McGill); Chemist.
G. W. HODGSON, M.Sc. (Alberta), Ph.D. (McGill); Head, **Petroleum Division.**
B. L. BAKER, M.Sc. (Alberta); Chemist.
A. T. BLADES, B.Sc. (Western Ontario), M.Sc., Ph.D. (Wisconsin); Chemist.
H. S. ELLIS, B.Sc. (London); Engineer.
B. HITCHIN, Ph.D. (Manchester); Geologist.
R. F. KLEMM, Ph.D. (Michigan); Chemist.
J. KRUYER, B.Sc. (Alberta); Engineer.
R. NEWTON, B.Sc. (London); Mathematician.
D. S. PASTERNACK, B.Sc. (Queen's), M.Sc., Ph.D. (McGill); Chemist.
P. J. REDBERGER, B.Sc. (Moravian College); Mathematician.
G. F. ROUND, Ph.D. (Birmingham); Engineer.

K. TAGUCHI, D.Sc. (Tohoku); Post-doctoral Fellow, Petroleum.
S. W. CREIGHTON, M.A. (Quee's), Ph.D. (Yale); Chemist, **Natural Gas.**
T. W. RACZUK, M.Sc. (Alberta); Engineer.
R. M. ELOFSON, B.Sc. (Alberta), Ph.D. (Wisconsin); Head, **Special Fuels Projects.**
F. F. GADALLAH, B.Sc. (Cairo); Chemist.
T. KANEDA, B.Eng., D.Sc. (Tokyo Institute Technology); Microbiologist.
Y. NAMBA, M.Sc., D.Sc (Tohoku); Post-doctoral Fellow, Microbiology.
K. F. SCHULZ, Ph.D. (Zagreb); Chemist.
J. S. CHARLESWORTH, B.Sc. (Alberta); Chemist-in-Charge, **Gasoline and Oil Testing Laboratory.**
GLADYS M. STOTT, B.Sc. (Alberta); Chemist.

Earth Sciences Branch

R. GREEN, Ph.D. (Dunelm); Head, **Geology Division.**
L. A. BAYROCK, M.Sc. (Alberta), Ph.D. (Wisconsin); Geologist.
M. A. CARRIGY, M.Sc. (West. Australia); Sedimentologist.
J. D. GODFREY, B.Sc. (Nottingham), M.Sc., Ph.D. (Chicago); Petrologist.
G. J. GOVETT, B.Sc. (S. Wales), D.I.C., Ph.D. (London); Geochemist.
L. B. HALFERDAHL, M.Sc. (Queen's), Ph.D. (Johns Hopkins); Mineralogist.
G. B. MELLON, M.Sc. (Alberta), Ph.D. (Penn. State); Sedimentologist.
T. RIGG, M.Sc., Ph.D. (Dunelm), Geochemist.
J. H. WALL, B.S. (New Brunswick), M.Sc. (Alberta), Ph.D. (Missouri); Micropaleontologist.
D. H. LENNOX, B.A. (Toronto), M.Sc. (Alberta); Head **Groundwater Division.**
V. D. CARLSON, B.Sc. (Alberta); Geologist.
G. M. GABERT, B.Sc. (Alberta); Geologist.
K. W. GEIGER, B.Sc. (Alberta), M.S., Ph.D. (Cornell); Geologist.
G. LeBRETON, B.Sc. (Wales); Geologist.
O. TOKARSKY, B.Sc. (Western Ontario); Geologist.
J. TOTH, Geol. drs. (R. U. Utrecht); Hydrologist.
A. VANDEN BERG, Geol. drs. (R. U. Utrecht); Geologist.
W. ODYNSKY, M.Sc (Alberta); Head, **Soils Division.**
J. D. LINDSAY, M.S.A. (British Columbia); Soil Surveyor.
L. E. LOWE, M.A. (Oxford), M.Sc., Ph.D. (McGill); Soil Chemist.
S. W. REEDER, M.Sc. (McGill); Soil Surveyor.
M. D. SCHEELAR, B.Sc. (Alberta); Soil Surveyor.
A. WYNNYK, M.Sc. (Alberta); Soil Surveyor.

Highway Research

B. P. SHIELDS, B.Sc. (Manitoba), M.Sc. (Alberta); Head, **Highway Research.**
A. B. HAMILTON, B.Sc. (Manitoba), M.Sc. (Alberta); Engineer
C. R. NEILL, B.Sc. (Glasgow), M.Sc. (Alberta); Engineer.
H. H. RIX, M.Sc. (Alberta); Engineer.

Industrial Engineering Services

J. GREGORY, M.Sc. (Alberta); Head, **Industrial and Engineering Servcies.**
A. ANDERSON, B.Sc. (Saskatchewan); Engineer.
J. D. DALE, M.Sc. (Alberta); Engineer.
J. N. ERGIL, M.Sc. (Pittsburgh); Engineer.
A. FITZPATRICK, B.Sc., M.A. (Alberta); Engineer.
M. P. LEE. B.Sc. (Alberta); Chemist.
D. J. SAKELLARIOU, B.Sc. (Athens); Chemist.
S. J. WISKEL, M.Sc. (Alberta); Engineer.

Cloud Physics and Hail Research

P. W. SUMMERS, B.Sc. (Nottingham), D.I.C. (Imperial College), Ph.D. (McGill); Meteorologist.

THE PROVINCIAL LABORATORY OF PUBLIC HEALTH

This institution, which is established both at Edmonton and Calgary, is administered by the University and its senior staff members at Edmonton are members of University teaching departments and conduct certain University courses within the Laboratory building.

The staff includes:

R. D. STUART, M.B., Ch.B., M.D., D.Sc., D.P.H. (Aberdeen), F.R.C.P. (Glasgow); Provincial Bacteriologist and Director, Provincial Laboratory of Public Health.

D. SHUTE, M.B., Ch.B., M.D. (Manchester), D.T.M. (Liverpool); Director of Provincial Laboratory of Public Health (Calgary).

J. W. MACGREGOR, B.A., M.D. (Alberta); Provincial Pathologist.

E. J. K. PENIKETT, M.B., B.S., Ph.D. (London); Deputy Director and Senior Assistant Bacteriologist.

J. W. CARMICHAEL, M.Sc. (Alberta), M.A., Ph.D. (Harvard); Specialist in Mycology.

G. O. BAIN, B.Sc., M.D. (Alberta); Assistant Pathologist.

ERIKA P. CRICHTON, M.B., Ch.B. (Glasgow); Chief Assistant and Bacteriologist, Provincial Laboratory of Public Health, Calgary.

T. K. SHNITKA, M.Sc., M.D. (Alberta); Assistant Pathologist.

SHEILA R. TOSHACH, B.Sc. (Alberta), M.A., Dip.Bact. (Toronto); Assistant Bacteriologist.

ODOSCA MORGANTE, M.D. (Rome), M.Sc., Ph.D. (McGill); Virologist.

T. A. KASPER, B.Sc., M.D. (Alberta); Assistant Pathologist.

R. J. SWALLOW, B.A. (Saskatchewan), M.D. (Alberta); Assistant Pathologist.

ANNE M. BURSEWICZ, M.B., Ch.B. (Edinburgh), D.P.H. (Toronto); Assistant Bacteriologist.

YVONNE GOODMAN, B.Sc. (Alberta); Assistant Bacteriologist.

NORMAN SENN, B.Sc. (Alberta), Administrator, Provincial Laboratory of Public Health.

ST. JOHN'S COLLEGE

St. John's College in the City of Edmonton was affiliated with the University in 1963 under an agreement designed to train teachers who would be qualified to use for instructional purposes in the schools either the French or English language. Its provisions include the offering by the College of certain courses which are accepted by the University as part of a three-year program leading to a professional teaching certificate or as part of a four-year progam leading to the degree of Bachelor of Education.

The following members of the staff of the College have been approved as instructors in these courses:

Fr. T. BILODEAU, B.Ed. (Ottawa), L.Th., L.Ph. (Rome); Instructor in Philosophy.

Sr. ST. LEON DE VENISE, M.A. (Montreal); Instructor in Frnech.

M. LEGRIS, B.A. (Ottawa), M.A. (North Carolina); Instructor in English.

J. G. TOURIGNY, B.Sc. (Alberta), Instructor in Chemistry.

Fr. E. DROUIN, B.Ed. (Alberta), M.A.Ed. (Detroit), Ph.D. (Ottawa); Instructor in History.

INDEX

Page

Academic Awards 29, 525
Academic Schedule 7
Academic Costume 671
Academic Honors 29
Academic Staff—See under departments and at pages ..... 634 and 664
Accounting 158, 310
Administrative Officers, Calgary 664
Administrative Officers, Edmonton 632
Admission Regulations 14, 43, 80, 156, 171, 183, 199, 247, 304 316, 317, 359, 373, 392, 404, 469
Advanced Standing 17, 199
Affiliated Institutions 681
Affiliations 2
Agriculture, B.Sc. in 44
Agriculture, Faculty of 41, 556, 627
Agricultural Economics 46, 47, 51, 475
Agricultural Engineering 46, 47, 53, 476
Anaesthesia 190, 323
Anatomy 187, 323, 395, 476
Animal Science 46, 47, 54, 476
Anthropology 150
Appeals re Examination Results 26
Appeals, General 30
Art 101
Arts, Faculty of, Edmonton 79, 542, 627
Arts and Science, Faculty of, Calgary 544, 663
Astronomy 410
Athletics 36, 373
Attendance 31
Awards—
- Matriculation 525
- Undergraduate 538
- Graduate 584
- Made by other institutions 592

Bachelor of Arts, General Program 83
Bachelor of Commerce 157
Bachelor of Divinity 672, 681
Bachelor of Education 84, 205, 298, 377, 408
Bachelor of Education, Special Programs 213, 214, 215, 216, 220
Bachelor of Fine Arts 101
Bachelor of Laws 305
Bachelor of Music 103
Bachelor of Science, General Program 406
Bacteriology 324, 447

Page

Banff School of Fine Arts 677
Biochemistry 188, 324, 339, 410, 478
Biology 412
Biometrics 57
Board of Governors 622
Bookstore 35
Botany 58, 413, 478
Bursaries, Scholarships and Fellowships 523
Business 159
Business Education 234

Camrose Junior College 680
Canadian Officers' Training Corps 36, 616
Cancer Research Unit 315
Chancellor 622
Chemical Engineering 250, 262, 479
Chemistry 417, 481
Civil Engineering 252, 257, 482
Classics 87, 484
Classification of Students 17, 468
Combined Course—
B.A., LLB. 85, 311
Commerce, Faculty of 153, 485, 558, 628
Comparative Literature 91, 486
Computing Science 160, 288, 423, 486
Conduct and Discipline 31
Convocation 624
Co-ordinating Council 625
Counselling Services 32

Dairy Science 46, 48, 59, 487
D.D.S. 184
Dean of Women 31
Deans' Councils 31, 626, 663
Degrees and Diplomas Offered 12
Degrees in Absentia 28
Degrees with Honors in Arts 29, 82
Degrees with Honors in Science 29, 405
Degrees with Distinction 29, 157
Dental Auxiliaries 173, 183
Dental Hygiene, School of 170, 182, 563, 628
Dental Practice 181, 193
Dental Prosthesis 188
Dental Public Health 188
Dentistry, Clinical 195
Dentistry, Faculty of 179, 408, 487, 560, 628
Discipline 31
Doctor of Philosophy 472
Doctor of Science and Doctor of Letters 474

Page

Doctor of Education 474
Drama 109

Economics 62, 92, 513
Education, Faculty of, Calgary 198, 563, 663
Education, Faculty of, Edmonton 198, 372, 563, 628
Educational Administration 223, 233, 488
Educational Foundations 223, 229, 489
Educational Psychology 223, 230, 490
Electrical Engineering 254, 274, 491
Electrotherapy 400
Elementary Education 223, 224, 491
Emeriti 660, 670
Employment Service 34
Endodontics 189
Engineering, Faculty of 246, 567, 628
Engineering, Bachelor of Science in 250
Engineering Physics, B.Sc. Degree in 259
English 97, 238, 492
Entomology 46, 48, 63, 424, 494
Evening Credit Program 13
Examinations 25
Extension, Department of 674
Extension Library 676
Extracurricular Activities, Relation of Scholastic Standing to 30
Extramural Study 199, 201

Faculty Colors 671
Faculty Councils 626, 663
Fees 19
Fellowships 523
Field Crops 67
Finance 161
Financial Aid 566, 606, 609, 612
Fine Arts 101
First-Class Standing 29
Food Chemistry 61
Food Microbiology 60
Food Technology 60
French (See Romance Languages)

Genetics 46, 48, 64, 425, 494
General Literature 110
General Organization, Calgary 663
General Organization, Edmonton 626
Geography 111, 162, 429, 495
Geology 289, 431, 495
Germanic Languages 114, 496
Governing Body 622
Grading System 29

Page

Graduate Studies, Faculty of 467, 584, 629
Greek (See Classics)

Health Service 33
Hebrew 682
History 120, 497
Horticulture 71
Hospital, University and Associated Hospitals 315, 393, 681
Household Economics 239, 299, 499
Household Economics, B.Sc. Degree in 297
Household Economics, School of 295, 572, 629
Humanities 85

Industrial Arts, B.Ed. Degree 214, 235
Industrial and Vocational Education 224, 449
Industrial Laboratories 678
Intersession 470
Italian (See Romance Languages)

Junior Colleges 678
Junior E. Certificate (Education) 205

Latin (See Classics)
Law, Faculty of 303, 573, 629
Lethbridge Junior College 679
Libraries 182, 672
Linguistics 118, 496, 500
Living Accommodation 34, 35

Marketing 164
Master of Arts, Master of Education, Master of Science 472
Mathematics 124, 436, 502
Mathematical Physics 503
M.D. Degree 314, 315, 319, 320
Mechanical Engineering 255, 278, 504
Medals 523
Medical Council of Canada 316
Medical Examination 17
Medical Laboratory Science, B.Sc. in 314, 319, 336
Medical Practice 315, 316
Medical Undergraduate Society 315
Medicine and Clinical Medicine 189, 325, 506
Medicine, B.Sc. in 314
Medicine, Faculty of 84, 313, 408, 575, 629
Metallurgical Engineering 257, 284
Microbiology 444, 477
Minimum Length of Time to Complete Courses 12
Mining Engineering 258
Mining and Metallurgy 257, 283, 506
Mount Royal College 679
Music 103

Page

Natural Sciences ... 86
Nursing Education ... 353
Nursing Programs ... 345, 350
Nursing, School of ... 343, 579, 630

Occupational Therapy ... 394
Obstetrics and Gynaecology ... 326
Obstetrical Nursing ... 352, 354
Operative Dentistry ... 194
Oral Anatomy ... 193
Oral Diagnosis ... 190
Oral Surgery ... 190
Orthodontics ... 191

Paediatrics ... 327, 506
Pathology ... 327, 340, 506
Payment of Fees ... 23
Pediatric Dentistry ... 191
Pedodontics ... 191
Periodontics ... 192
Personnel ... 165
Petroleum Engineering ... 252, 266, 479
Pharmacology ... 328, 507
Pharmacy ... 357, 365, 508
Pharmacy, Bachelor of Science in ... 360
Pharmacy, Faculty of ... 357, 580, 630
Pharmacy, Practice of ... 359
Philosophy ... 125, 508
Physical Education, B.P.E. Degree ... 374, 378
Physical Education, Faculty of ... 33, 241, 371, 509, 582, 630
Physical Science ... 447
Physics ... 292, 447, 510
Physiology ... 329, 453, 511
Physical Therapy and Occupational Therapy, Curricula ... 394, 398
Plant Pathology ... 72
Plant Physiology and Biochemistry ... 73, 457
Plant Science ... 46, 48, 70, 512
Polish (See Slavonic Languages)
Political Science ... 128, 513
Poultry Science ... 56
President of the University ... 622
President, Calgary ... 663
President, Edmonton ... 626
Preventive Dentistry ... 188
Preventive Medicine ... 329
Prizes ... 523
Production ... 166
Programs of Study ... 12
Promotion Regulations ... 43, 81, 172, 184, 249, 297
305, 318, 349, 360, 394, 405

Page

Provincial Laboratory of Public Health 685
Provost 31
Psychiatry 193, 330
Psychology 132, 457, 515
Public Health Nursing 350, 353

Radiology 331, 516
Railway Rates 35
Recreation Leadership, Bachelor of Arts 375, 381
Red Deer Junior College 680
Registration 18, 184, 200, 248, 469
Regulations, academic 25, 469
Regulations, special 32
Rehabilitation 396
Rehabilitation Medicine, School of 389, 582, 630
Research Council of Alberta 684
Residence Requirements 29
Residences 34
Restorative Dentistry 193
Romance Languages 135, 239, 517
Royal Canadian Air Force 38, 617
Russian (See Slavonic Languages)

St. John's College 686
St. Joseph's College 683
St. Stephen's College 672, 681
Scandinavian 118
Scholarships 523
Science, Faculty of, Edmonton 185, 403, 453, 631
Secondary Education 223, 226, 518
Senate 31, 35, 623
Slavonic Languages 141, 518
Social Sciences 86
Sociology and Anthropology 145, 519
Soil Science 46, 49, 75, 520
Southern Alberta Institute of Technology and Art 683
Spanish (See Romance Languages)
Sports 36, 373
Statistics 461, 504
Student Affairs 32
Student Government 35
Student Housing 34, 35
Students' Union 31, 35
Summer Session 13
Supplemental Examinations 27, 201, 318
Surgery and Clinical Surgery 194, 331, 521

Teachers, Certification of 198, 201, 202
Test Weeks 26

Page

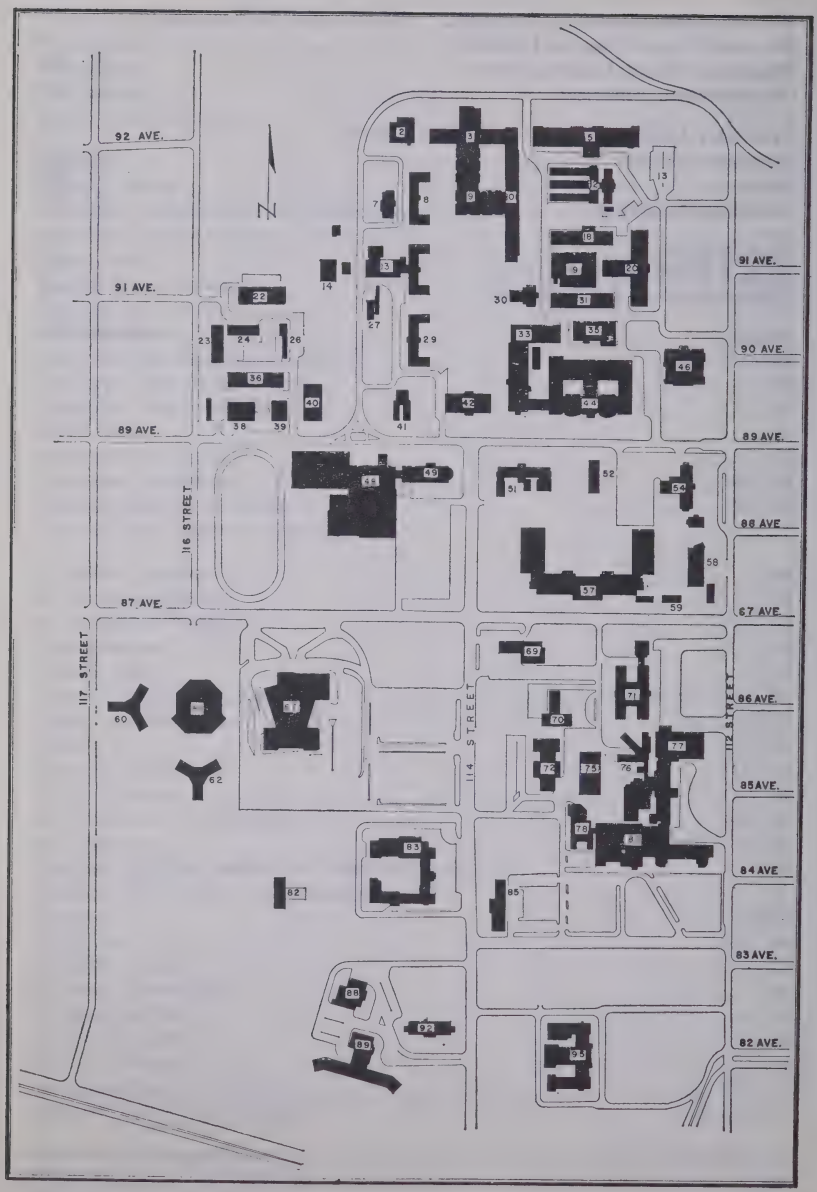
Ukrainian (See Slavonic Languages)
University Naval Training Division 36
University Officer Training Units 36, 612
Unstatisfactory Standing 29

Veterinary Colleges, Ontario and Saskatchewan 49
Veterinary Science 56, 369
Visitor 622
Vocational Education 215, 237

Weed Science 74
Western Board of Music 684
Withdrawal from the University 30, 33

Zoology 431, 462, 521

MAP OF EDMONTON CAMPUS



UNIVERSITY OF ALBERTA

DIRECTORY OF BUILDINGS AND DEPARTMENTS, 1964

NOTE: The numbers run from north to south on the adjacent map.

Aberhart Sanatorium 89
Administration Building 42
Agricultural Engineering, north entrance of 18
Agricultural and Biological Sciences Building 5
Alberta Research Council 69
Alumni Secretary 49
Anatomy, 3rd floor of 44
Animal Science 5
Armed Services 40
Arts Building 20
Assiniboia Hall 8
Athabasca Hall 13

Bacteriology 72
Biochemistry, 3rd floor of 44
Bookstore 42
Botany 5

Cafeteria 30
Cameron Library 19
Cancer Clinic 78
Chemistry 10
Chemical Engineering, west entrance of 44
Civil Engineering, west entrance of 33
Civil Engineering, Structures Lab. 14
Classics, 2nd floor of 20
Commerce 52
Computing Science 3
Convocation Hall, main floor of 20
C.O.T.C. Orderly Room 40
Counselling Services 57

Dairy Science, north entrance of 31
Deliveries 36
Dentistry 44

Economics 18
Education Building 57
Electrical Engineering 33
Engineering Building 33
English 8
Entomology 5
Evening Credit Program Director 57
Extension Department, south side of 31
Extension Library, west entrance of .. 46

Farm Management 41
Fine Arts 20

Garages 24
Gateway Office 49
Geography 20
Geology 5
Germanic Languages 20
Graduate Studies, Dean 42
Greenhouses 12
Grounds Department 26, 27
Gymnasium 48

Health Services 70
History, 2nd floor of 20
Household Economics, north entrance of 31
Household Economics, new building .. 58
Hydraulics 22

Industrial Laboratories, east entrance of 31

Law 46
Lecture Wing V 9

Library, Undergraduate 46
Library, Graduate 19
Lister Hall, cafeteria 61

Mathematics 3
Mechanical Engineering 33
Medical Sciences Building 44
Medicine and Clinical Medicine 80
Microbiology 44
Mining and Metallurgy, east entrance of 18

National Employment Service 42
North Laboratory Building 18
Nurses' Homes 83, 92
Nursing 90

Obstetrics and Gynaecology 80
Ophthalmology and Oto-Laryngology 80

Parking Areas 1, 13
Parking Area (Visitors) 89th Avenue, north side.
Pathology 80
Pembina Hall 29
Petroleum Engineering, south entrance of 33
Pharmacy 44
Philosophy 20
Physical Education 48
Physics 3
Physiology and Pharmacology 44
Plant Science 5
Political Science 8
Post Office 42
Power Plants 35, 82, 88
Provincial Analyst, east entrance of .. 31
Provincial Auditorium 67
Provincial Lab. of Public Health 72
Provincial Gasoline Testing Lab. 69
Provost 42
Psychology 20

Radio Studio 20
Rehabilitation Medicine 90
Research Council of Alberta 69
Residences, New 62
Rink 48
Romance Languages 20
Rutherford Library 46

St. Joseph's College 51
St. Stephen's College 54
Slavonic Languages 20
Sociology 7
Soil Science 5
Soil Survey 5
South Laboratory Building 31
Stores 36
Superintendent of Buildings 39
Student Counselling Services 57
Students' Union 49
Summer Session, Director 57
Surgery and Clinical Surgery 80

Telephone Switchboard 42

University Hospital: Main Building 80

Van de Graaff Building 2

West Laboratory Building 41
Works Department 38

Zoology 5

UNIVERSITY OF ALBERTA

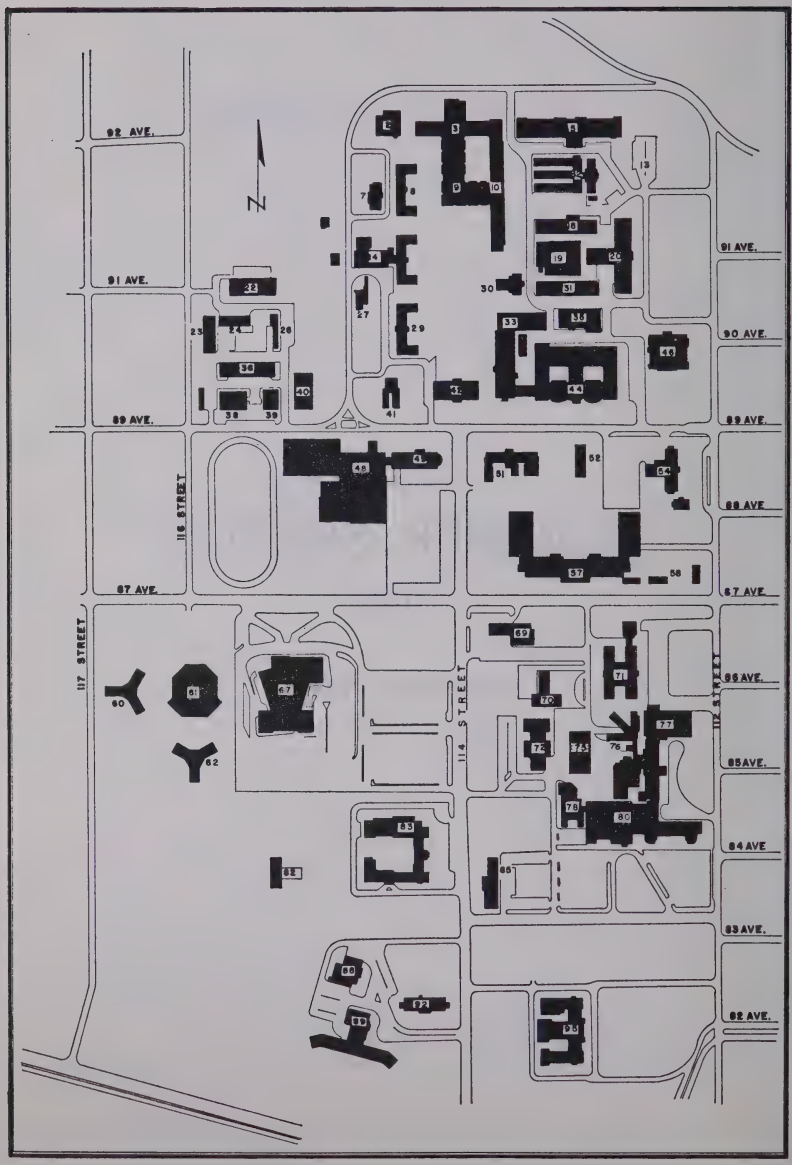
Forty-sixth

SUMMER SESSION

1964

Edmonton, Alberta

MAP OF EDMONTON CAMPUS



UNIVERSITY OF ALBERTA

DIRECTORY OF BUILDINGS AND DEPARTMENTS, APRIL, 1963

NOTE: The following numbers run from north to south on the adjacent map.

Aberhart Sanatorium 89
Administration Building 42
Agricultural Economics 41
Agricultural Engineering, north entrance of 18
Agricultural and Biological Sciences Building 5
Alberta Research Council 69
Alumni Secretary 49
Anatomy, 3rd floor of 44
Animal Science 5
Armed Services 40
Arts Building 20
Assiniboia Hall, Men's Residence 8
Athabasca Hall, Men's Residence 14

Bacteriology 72
Biochemistry, 3rd floor of 44
Bookstore 42
Botany 5

Cafeteria 30
Cancer Clinic 78
Chemistry 10
Chemical Engineering, west entrance of 44
Civil Engineering, west entrance of 33
Classics, 2nd floor of 20
Commerce 52
Convocation Hall, main floor of 20
C.O.T.C. Orderly Room 40
Counselling Services 57

Dairy Science, north entrance of 31
Deliveries 36
Dentistry 44

Education Building 57
Electrical Engineering 33
Engineering Building 33
English, 2nd floor of 20
Entomology 5
Evening Credit Program Director 57
Extension Department, south side of 31
Extension Library, west entrance of 46

Farm Management 41
Fine Arts 20

Garages 24
Gateway Office 49
Geography 20
Geology 5
Graduate Studies, Dean 42
Greenhouses 12
Grounds Department 26, 27
Gymnasium 48

Health Services 70
History, 2nd floor of 20
Household Economics, north entrance of 31
Hydraulics 22

Industrial Laboratories, east entrance of 31

Law, 2nd floor of 20
Lecture Wing V 9
Library, Undergraduate 46
Library, Graduate 19
Lister Hall 61

Mathematics 3
Mechanical Engineering 33
Medical Sciences Building 44
Medicine and Clinical Medicine 80
Microbiology 44
Mining and Metallurgy, east entrance of 18
Modern Languages 20

National Employment Service 42
North Laboratory Building 18
Nurses' Homes 83, 92
Nursing 44

Obstetrics and Gynaecology 80
Ophthalmology and Oto-Laryngology 80

Parking Areas 1, 13
Parking Area (Visitors) 89th Avenue, north side.
Pathology 80
Pembina Hall, Women's Residence 29
Petroleum Engineering, south entrance of 33
Pharmacy 44
Philosophy 20
Physical Education 48
Physics 3
Physiology and Pharmacology 44
Physical and Occupational Therapy 44
Plant Science 5
Political Economy 18
Post Office 42
Power Plants 35, 82, 88
Provincial Analyst, east entrance of 31
Provincial Auditorium 67
Provincial Lab. of Public Health 72
Provincial Gasoline Testing Lab. 69
Provost 42
Psychology 20

Radio Studio 20
Research Council of Alberta 69
Residences, New 62
Rink 48
Rutherford Library 46

St. Joseph's College 51
St. Stephen's College 54
Sociology 7
Soil Science 5
Soil Survey 5
South Laboratory Building 31
Staff Apartments 58
Stores 36
Superintendent of Buildings 39
Student Counselling Services 57
Students' Union 49
Summer Session, Director 57
Surgery and Clinical Surgery 80

Telephone Switchboard 42

University Hospital: Main Building 80

Van de Graaff Building 2

West Laboratory Building 41
Works Department 38

Zoology 5

In case of emergency, notify Power Plant (35)

For other information, apply to the office of the Bursar, Administration Building

TABLE OF CONTENTS

Page

Important Information ..... *Inside Front Cover*
Map of Edmonton Campus 2
Directory of Buildings and Departments, Edmonton Campus 3
Academic Schedule 5
Administrative Officers of the University 6
Academic Staff 6
GENERAL SECTION
- Classification of Students 10
- Matriculation Requirements 11
- Matriculation Deficiencies 12
- Admission Procedures 12
- Registration Procedures 13
- Fee Schedule 15
- Preparatory Study 16
- Attendance 17
- Examinations 17
- Living Accommodation 19
- Student Counselling Services 19
- Student Health Services 20
- Teacher Placement Service 20
- Reduced Railway and Bus Fares 20
- Extracurricular Activities 20
- Fall Convocation, 1964 20

FACULTY OF ARTS 21
FACULTY OF SCIENCE 23
FACULTY OF EDUCATION
- General Information 25
- Standard Elementary B.Ed. Program 26
- Standard Secondary B.Ed. Program 30
- B.Ed. Program in Industrial Arts 35
- B.Ed. Program in Vocational Education 35
- B.Ed. Programs for Holders of Approved Degrees 36
- Advanced Study in Education (Degree and Diplomas) 39
- Leadership Course for School Principals 40

FACULTY OF GRADUATE STUDIES 41
SUMMER SCHOOL OF LINGUISTICS 42
DETAILS OF COURSES
- Accounting, Anthropology, Art 43
- Business Law, Chemistry, Classics, Drama 44
- Economics 45
- *Education*: Administration 45
  - Business, Curriculum and Instruction 46
  - Industrial Arts, Vocational 48
  - Foundations, Psychology 49
- English 51
- French, Geography 52
- German, History 53
- Household Economics, Linguistics 54
- Mathematics 55
- Music, Philosophy 56
- Physical Education 57
- Physical Science, Physics, Political Science, Psychology 58
- Russian, Sociology 59
- Ukrainian, Zoology 60

TIMETABLES: Edmonton 55
Calgary 57
Textbook Order Form 58
Directory ..... *Inside Back Cover*

ACADEMIC SCHEDULE

Summer Session, 1964

February—

Monday, 17—

Last day for receiving registrations in English 200.

March—

Tuesday, 31—

Last day for receiving Summer Session registrations with entitlement to discount on tuition fees.

April—

Wednesday, 1—

Last day for receiving applications for admission from new students, undergraduate or graduate, who wish to enter the University in the 1964 Summer Session.

Last day for students to file Application for Transfer of Record from Calgary to Edmonton campus. (For details, see reverse side of registration form.)

Thursday, 30—

Last day for receiving Summer Session registrations.

June—

Friday, 5—

Last day for the payment of Summer Session fees without penalty.

July—

Thursday, 2—

8:00 a.m.—Lectures begin.

9:00 a.m.-11:00 a.m.
12:00 noon- 2:00 p.m. } Confirmation of registration: New Education—Building, Arts Building and Lecture Wing of Mathematics-Physics and Chemistry Building.

Thursday, 9—

Last day for payment of Summer Session fees.

Wednesday, 15—

Last day for application for Graduate degrees and degrees in Arts, Science, Education and Pharmacy, to be conferred at Fall Convocation.

August—

Thursday, 13 and Friday, 14—

Final examinations.

ADMINISTRATIVE OFFICERS OF THE UNIVERSITY

Edmonton

President of the University—Walter Hugh Johns, B.A., Ph.D., LL.D.
Vice-President—Herbert Stoker Armstrong, M.A., Ph.D., F.R.S.C.
Provost and Executive Assistant to the President—Aylmer Arthur Ryan, B.A., M.A.
Executive Assistant to the Vice-President—Bernard Edward Riedel, M.Sc., Ph.D.
Assistant to the President—Harold Richard Hawes, B.Sc.
Director of the Summer Session and Evening Credit Program—John William Gilles, M.A., M.Ed., Ed.D.
Dean of the Faculty of Arts—Douglas Elstow Smith, M.A., Ph.D.
Assistant Dean—John Winstanley Bilsland, M.A., Ph.D.
Dean of the Faculty of Science—Max Wyman, B.Sc., Ph.D., F.R.S.C.
Assistant Dean—Kenneth Bateman Newbound, M.Sc., Ph.D.
Dean of the Faculty of Education—Herbert Thomas Coutts, B.A., M.A., Ph.D.
Assistant Dean—Wilfred Pilkington, M.A., B.Ed.
Dean of the Faculty of Graduate Studies—Arthur Gilbert McCalla, M.Sc., Ph.D., F.R.S.C., F.A.I.C.
Assistant to the Dean—Thorleif Fostvedt, B.Sc., S.M.
Dean of the Faculty of Physical Education—Maurice Lewis Van Vliet, B.S., M.S., Ed.D.
Director of the School of Household Economics—Elizabeth L. Empey, B.Sc., M.N.S., Ph.D.
Director of Extension—Darroch Duncan Campbell, B.A., B.Com., M.A.
Acting Director of Student Counselling Services—Peter P. Rempel, B.A., B.Ed., Ph.D.
Dean of Women—Mrs. J. Grant Sparling, B.A., Dip.S.W.
Librarian to the University—Bruce Braden Peel, M.A., B.L.S.
Registrar of the University—Alexander Duncan Cairns, B.A.
Assistant Registrar—Lynn Parkes Morgan, B.A.
Bursar of the University—John MacLean Whidden, B.Com.
Chief Accountant—Murray Alexander Rousell, B.Com., C.A.
Purchasing Agent—Edward Frederick Hunter, B.Com.
Accountants—Albert Stephen Knowler, B.Com., Delmer Perry Brooks, B.Com., C.A.
Director of Student Health Services—James Frank Elliott, B.A., M.D., F.R.C.P.(C.), F.A.C.P.
Director of Food Services—Margaret Shaw, B.Sc.
Personnel Officer—Murray Stewart Cooke, B.S.A.
Advisor to Men Students—Roland Charles Wilkins Hooper, Major, Dip.R.M.C., P.S.C.
Director of Housing—George M. Tauzer, B.Sc.

ACADEMIC STAFF

ANDREWS, J. H. M., B.A., M.A., Ph.D., Professor of Educational Administration, University of Alberta.
ARMSTRONG, R. D., B.A., M.Ed., Assistant Professor of Elementary Education, University of Alberta.
BARRY, D. D., A.O.C.A., Extension Assistant Professor of Art, University of Alberta.
BERRY, G. L., B.A., M.A., B.Ed., Ed.D., Associate Professor of Secondary Education, University of Alberta.
BESSAI, F., B.A., M.A., Ph.D., Assistant Professor of English, University of Alberta.
BESSAI, Diane, M.A., Assistant Professor of English, University of Alberta.
BICKNELL, J. E., B.Sc., B.Ed., M.Sc., Ph.D., Director of Research, Minnesota State Department of Education.
BOCIURKIW, B. R., B.A., M.A., Ph.D., Associate Professor of Political Science, University of Alberta.
BOSLEY, R. N., B.A., M.A., Sessional Lecturer in Philosophy, University of Alberta.
BRESLIN, Hazel, B.S., M.A., Assistant Professor of Home Economics, Arizona State University, Tempe.
BUCK, R. J., B.A., M.A., Ph.D., Associate Professor of Classics, University of Alberta.
BUECKERT, F., B.Ed., A.M., Assistant Professor of Drama, University of Alberta.
BUTLER, D. C., B.A., M.A., Graduate Teaching Assistant, University of Washington.
CAMPBELL, D. A., B.Ed., Sessional Lecturer in English, University of Alberta.

CAMPBELL, M. W., B.Ed., B.A., Sessional Instructor in Secondary Education, University of Alberta.

CANNON, Garland, B.A., M.A., Ph.D., Associate Professor of English, Queen's College, The City University of New York.

CARRAN, A. B., B.S., Ph.D., Research Associate, Department of Psychology, University of Alberta.

CARSON, Audrey M., B.Ed., M.A., Assistant Professor of Physical Education, University of Alberta.

CAUDWELL, Margaret, Principal Lecturer in Physical Education, City of Coventry Training College, England.

CONNELL, Allison, B.A., D.U., Assistant Professor of French, United College, Winnipeg.

CROPLEY, A. J., B.A., Dip.Ed., M.Ed., Graduate Teaching Assistant, Department of Educational Psychology, University of Alberta.

CROSBY, D. R., B.Sc., M.A., Ph.D., D.Phil., Associate Professor of Mathematics, University of Alberta.

DAINARD, J. A., B.A., M.A., B.L.S., Sessional Lecturer in French, University of Alberta.

DANNENMAIER, W. D., A.B., M.A., Ed.D., Associate Professor of Educational Psychology, University of Alberta.

DAVIS, A. K., A.B., Ph.D., Senior Research Sociologist, Centre for Community Studies, University of Saskatchewan, Saskatoon.

DAVIS, Jo Ann, B.A., M.A., Instructor in French, University of Washington.

DAWSON, L. S., B.Ed., B.A., Sessional Instructor in Secondary Education, University of Alberta.

DENIS, P., B.A., B.Com., Sessional Lecturer in Political Economy, University of Alberta.

DONLEY, H. E., B.S., in Ed., A.M., Ph.D., C.P.A., Associate Professor of Accounting, Bowling Green State University, Ohio.

DUGGAN, Grace, B.S., B.Ed., M.S., Associate Professor of Household Economics, University of Alberta.

DUNLOP, G. M., B.A., M.A., Ph.D., Professor and Chairman, Department of Educational Psychology, University of Alberta.

DUNNIGAN, F., B.Ed., Associate in Music, Edmonton.

DUTTON, J. D., B.S., M.A., Ph.D., Associate Professor of Sociology, San Jose State College.

EASTWOOD, G. R., B.A., B.Ed., M.A., Ph.D., Lecturer in Education, University of New England, New South Wales, Australia.

ELLIOTT, G. M., B.Sc., Assistant Professor of Physical Education, University of Alberta.

FILIPOWSKI, Elizabeth Helen, B.Ed., M.A., Assistant Professor of Elementary Education, University of Alberta.

FISH, D., B.A., M.A., Sessional Lecturer in Sociology, University of Alberta.

FORD, Ruth, G., B.Ed., Graduate Student, University of Alberta.

FORREST, J. F., M.A., B.Litt., A.M., Ph.D., Assistant Professor of English, University of Alberta.

FOSTVEDT, T., M.S., Associate Professor of Mathematics, University of Alberta.

FRENCH, C. L., A.B., A.M., Ph.D., Associate Professor of Sociology, University of Saskatchewan, Regina.

GARBUTT, G. A., B.Com., Graduate Teaching Assistant, Department of Secondary Education, University of Alberta.

GRESCHUK, Corinne P. M., B.Sc., M.Sc., Instructor of Home Economics, University of Alberta.

HARVEY, W. D., M.A., Ph.D., Assistant Lecturer in Geography, Bristol University, England.

HERTZOG, R. L., B.A., Dip.Ed., Graduate Teaching Assistant, Department of Educational Psychology, University of Alberta.

HIGGINBOTHAM, Dorothy, C., B.S., M.A., Ph.D., Chairman, Department of Speech, Southeastern State College, Durant, Oklahoma.

HOIJER, H., A.B., A.M., Ph.D., Professor of Anthropology, University of California, Los Angeles.

HOWARTH, E., B.Sc., M.Sc., Ph.D., Associate Professor of Psychology, University of Alberta.

HULMES, F. G., B.A., M.A., Sessional Lecturer in Political Science, University of Alberta.

HUUS, Helen, B.A., Associate Professor of Education, Graduate School of Education, University of Pennsylvania.

HYNAM, C. A. S., Dip. I.C.T.A., M.S., Assistant Professor of Sociology, University of Alberta.

KALINOWSKY, M., E.S.C.P., M.A., Lecturer in French, University of Alberta.

KEMP, E. W., B.Ed., M.A., M.Ed., Victoria Composite High School, Edmonton, Alberta.

KLATTE, W. F., B.A., M.A., Ph.D., Assistant Professor of German and Linguistics, University of Alberta.

LARNER, J. W., B.A., M.A., Department of History, Pennsylvania State University, Altoona.

LEGRIS, M. R., B.A., B.Ph., M.A., Lecturer in English, Saint John's College, Edmonton.

LEHMAN, H., M.A., Ph.D., Assistant Professor of Philosophy, Western Washington State University, Bellingham.

LOGIE, L. J., B.A., B.Ed., M.A., Lecturer in English, Lethbridge Junior College.

LUPUL, M. R., B.A., B.Ed., M.A., Ph.D., Associate Professor of Educational Foundations, University of Alberta.

MacARTHUR, R. S., M.Ed., Ph.D., Professor of Educational Psychology, University of Alberta.

McCAUGHEY, G. S., C.D., B.A., M.A., Assistant Professor of English, University of Alberta.

MacDONALD, J., M.A., Ed.B., Ph.D., Associate Professor of Educational Psychology, University of Alberta.

MacINTYRE, Jean, B.A., M.A., Ph.D., Assistant Professor of English, University of Alberta.

McCLELLAN, Grace, B.A., M.A., Reading Clinician, Child Guidance Clinic of Greater Winnipeg.

MacLEOD, R. A., B.Sc., M.S., Sessional Lecturer in Mathematics, University of Alberta.

MALYCKY, A., B.A., M.A., Ph.D., Assistant Professor of Germanic and Slavic Languages, University of Cincinnati.

MELSNESS, H. C., B.Sc., M.A., Associate Professor of Educational Administration, University of Alberta.

MORAVCIK, I., B.A., M.A., Ph.D., Assistant Professor of Economics, University of Alberta.

MOSESON, Helen, V., B.H.Ec., M.A., Assistant Professor of Household Economics, University of Alberta.

MOTUT, R. G., B.A., B.Ed., M.A., Associate Professor of French, University of Alberta.

MOUW, R., B.A., Graduate Teaching Assistant in Philosophy, Universilty of Alberta.

MYSAK, L. A., A.Mus., B.Sc., M.Sc., Graduate Teaching Assistant, Department of Mathematics, Harvard University.

NEAL, W. D., B.A., B.Sc., B.Ed., Ed.D., Associate Professor of Educational Administration, University of Alberta.

NEARING, J. J., B.A., M.Ed., Sessional Instructor in Secondary Education, University of Alberta.

NELSON, L. D., B.Ed., M.Ed., Ph.D., Associate Professor of Elementary Education, University of Alberta.

NETTLER, G., A.B., M.A., Ph.D., Lecturer in Sociology, University of Alberta.

NYBERG, V. R., B.Sc., B.Ed., M.Ed., Co-ordinator of Testing and Research, Alberta Department of Education.

O'GRADY, G. N., B.A., Ph.D., Assistant Professor of Linguistics, University of Alberta.

PARKER-JERVIS, N., B.A., Sessional Lecturer in English, University of Alberta.

PEACOCKE, C. T., B.Ed., B.A., M.F.A., Assistant Professor of Drama, University of Alberta.

PEART, T. J., B.A., B.Ed., M.A., Ph.D., Sheldon-Williams Collegiate, Regina, Saskatchewan.

POWRIE, T. L., B.S.A., M.A., B.Phil., D.Phil., Assistant Professor of Economics, University of Alberta.

PRAGNELL, B. R., Dip.(Winnipeg School of Arts and Montreal School of Art and Design), Assistant Professor of Art, University of Alberta.

PROUTY, R., B.S., M.S., Onondaga Valley Academy, Syracuse Public Schools.

REEVES, A. W., M.A., Ed.D., Professor and Chairman, Department of Educational Administration of Alberta.

REGAN, J., B.A., M.Ed., Assistant Professor of Secondary Education, University of Alberta.

REINHOLD, E., B.Sc., M.A., Ph.D., Associate Professor of German and Head of Division of Germanic Languages, University of Alberta.

SCHROEDER, C. R., M.A., Ph.D., Associate Professor of Geography, Washington State University, Pullman.

SHAW, J. A., B.S., M.S., Assistant Professor in Extension, University of Alberta.

SLAVUTYCH, Y., A.M., Ph.D., Assistant Professor of Slavic Languages, University of Alberta.

SMITH, D. L., A.B., A.M., Ph.D., Professor of History, Miami University, Oxford, Ohio.

SMITH, M. F. R., B.Ed., Assistant Professor of Physical Education, University of Alberta.

SMITH, W. A. S., Ph.D., Associate Professor of Psychology, University of Alberta.

SMITH, W. D., B.P.H.E., M.A., Ed.D., Professor of Physical Education, University of Alberta.

SMITH, W. E., B.A., M.A., Ph.D., Professor of Sociology, Brigham Young University, Provo, Utah.

SNYDER, Sally, B.A., M.A., Ph.D., Cultural Anthropologist, Merrill-Palmer Institute, Detroit, Michigan.

STANGELAND, R. A., B.Mus., M.Mus., D.Mus., Assistant Professor of Music, University of Alberta.

STARCHUK, O., Licjur, et Rerpol, DrJur et RerPol, Associate Professor and Head, Division of Slavonic Languages, University of Alberta.

SUKAVA, A. J., M.Sc., Ph.D., Associate Professor of Chemistry, University of Western Ontario, London.

TAYLOR, J. B., A.O.C.A., Associate Professor of Art, University of Alberta.

TENNESSEN, H., M.A., Associate Professor of Philosophy, University of Alberta.

THOMAS, C. G., Sessional Lecturer in Art, University of Alberta.

THOMSON, K. H., M.A., B.Ed., Ed.D., Associate Professor of Educational Foundations, University of Alberta.

TRIEGER, S., B.A., M.A., Ed.D., Associate Professor of Elementary Education, University of Alberta.

VAN VLIET, M. L., B.S., M.S., Ed.D., Dean, Faculty of Physical Education, University of Alberta.

WALKER, B. E., M.A., Ph.D., Professor and Head, Department of Educational Foundations, University of Alberta.

WARDHAUGH, R., B.A., Dip.Ed., B.Ed., M.A., Graduate Student, Department of Secondary Education, University of Alberta.

WATSON, R. E. L., M.A., Ph.D., Associate Professor and Chairman, Department of Anthropology and Sociology, University of Victoria, Victoria, British Columbia.

WEBSTER, Alma, B.A., B.L.S., B.Ed., Assistant Library Specialist, Edmonton Public School Board.

WHITNEY, E. L., B.Sc., A.M., Ph.D., Associate Professor of Mathematics, University of Alberta.

WILSON, W. R., B.A., M.A., Ph.D., Assistant Professor of Psychology, University of Hawaii.

WINE, J. J., B.A., M.Sc., Lecturer in Educational Psychology, University of Alberta.

WOOD, J. D., B.A., M.A., Ph.D. Assistant Professor of Geography, University of Alberta.

WOOLCOCK, C. W., B.A., M.A., Ph.D., Principal, Hunter College High School for the Gifted and Associate Professor of Education, Hunter College, New York.

WORTH, W. H., B.Ed., M.Ed., Ed.D., Professor and Head, Department of Elementary Education University of Alberta.

YOUNG, Jean A., B.Ed., M.Ed., Sessional Lecturer in Reading and Language, Department of Elementary Education, University of Alberta.

GENERAL SECTION

The University of Alberta Summer Session at Edmonton offers a wide selection of courses for the convenience of students who are unable to attend the regular sessions. Special attention is given to meeting the needs of teachers desirous of improving their professional qualifications.

One important feature of Summer Session work is that a substantial portion of course content must be mastered before the session opens. The reason for this requirement is that summer courses carry the same credit as regular session courses, even though the summer term is of only six weeks' duration.

Students should register as early as possible. The deadline for registration is April 30.

The University reserves the right to restrict registration in, or to withdraw, any of the courses proposed for the 1964 Summer Session.

CLASSIFICATION OF STUDENTS

In the Summer Session students are classified as graduates, undergraduates, special, and auditors.

Graduate Students are admitted to the Faculty of Graduate Studies in one of the following categories:

1. **Candidate for a master's degree.**
2. **Provisional candidate for a doctor's degree.** All Ph.D., and Ed.D. candidates are classified as provisional candidates until they have passed their Candidacy Examinations.
3. **Probationary graduate student.** One whose university record is either: (a) difficult to assess (e.g., some foreign students) or (b) below the standard normally required.
4. **Conditional graduate student.** One who is required to take undergraduate courses prerequisite to, and in addition to, the graduate program. Fees for such courses are not included in graduate program fees.
5. **Special graduate student.** One who wishes to take graduate courses for purposes other than degree credit at this university.

Undergraduate Students are those who possess full senior matriculation and who are taking one or more courses for credit towards an undergraduate degree.

Special Students are those who, although registered in one or more courses, are currently neither seeking credit towards a degree or diploma granted by this university, nor entrance into a graduate program.

Auditors are students who have been granted official permission to attend lectures in a course on the understanding that they may not participate in class discussions, assignments or examinations. The audit privilege is restricted to a student who is currently registered in a degree or diploma program, and who secures written permission from the instructor in the course, endorsed by the students' Dean or Director, to register in the course as an auditor.

MATRICULATION REQUIREMENTS

General Requirements

Matriculants from the high schools of Alberta seeking admission to the University must possess—

(a) a high school graduation diploma with

(b) "B" (50%) or higher standing in the required courses of Grade XII as set forth in the prescriptions of the various faculties and schools, and

(c) an average in these courses of at least 60.0%.

Notes:—

1. A student from another Province in Canada who has obtained clear senior matriculation for the University or Universities of that Province will be admitted to the University of Alberta with clear matriculation subject to the requirements for the first year courses in each program. Students who do not have clear matriculation on this basis will be required to complete full Alberta matriculation of the Faculty to which admission is sought.

2. **These general requirements notwithstanding, the University may at its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an inordinate number of examinations in order to attain the nominal entrance requirements of the University of Alberta.**

Faculty of Arts

For a B.A. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3. Mathematics 30;
*4. One of: French 30, German 30, Latin 30, Spanish 30;
5. One of: Chemistry 30, Physics 30, Biology 30 or 32;
*6. One additional course from either (4) or (5) above.

Faculty of Science

For a B.Sc. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3. Mathematics 30;
*4. One of: French 30, German 30, Latin 30; Spanish 30;
5. and 6. Two of Chemistry 30, Physics 30, Biology 30 or 32.

Notes:—

1. Chemistry 30 and Physics 30 are strongly recommended as the science options.

---

*Students with the equivalent of senior matriculation credit in a language other than those listed, should submit a transcript for evaluation.

2. Students interested in Physical Science and Mathematics should note that, in addition to the six subjects noted above, Mathematics 31 (Trigonometry) is a prerequisite to Mathematics 201, 206, 207 and 271, and Physics 240 and 244.

Faculty of Education

For a B.Ed. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3, 4, 5, 6. **Four** of: French 30, German 30, Latin 30, Chemistry 30, Physics 30, Biology 30 or 32, Mathematics 30, Mathematics 31 (if credit obtained in June, 1962, or subsequently), Music 30.

Notes:—

1. Candidates intending to major in biological sciences or household economics should present Chemistry 30 or equivalent.
2. Candidates intending to major in physical sciences should present Chemistry 30, Physics 30, and Mathematics 30 or equivalents.
3. Candidates intending to major in mathematics should present Mathematics 31 in addition to Mathematics 30.
4. Mathematics 31 will be accepted only on the basis of a Grade XII Departmental examination.
5. Adult applicants (age 20 or over) will not be required to present a high school diploma, but (b) and (c) of the General Requirements still apply.

Other Faculties

Students interested in the matriculation requirements of other faculties and schools of the University should address a request for the appropriate calendar to the Registrar.

MATRICULATION DEFICIENCIES

1. Students wishing to remove matriculation deficiencies are advised that instruction in Grade XII courses will be provided in the summer of 1964 by the following: Alberta College, Edmonton; Edmonton Public School Board; Mount Royal College, Calgary; Lethbridge Junior College.
2. For the exclusive benefit of certificated teachers who wish to remove matriculation deficiencies, the Department of Education will conduct a special Grade XII Summer School on the University Campus at Edmonton during the 1964 Summer Session. Teachers interested in this service should communicate with Mr. C. G. Merkley, Department of Education, Edmonton.
3. Special arrangements for clearing matriculation deficiencies are also available in the Faculty of Education for teachers who were granted Alberta Second-Class Certificates prior to 1935. Teachers wishing to take advantage of these arrangements should communicate directly with the Dean of Education at Edmonton.

ADMISSION PROCEDURES

Application Forms

Prospective Summer Session students who have not previously attended the University of Alberta must secure and complete Application for Admission forms and must submit them to the appropriate office by April 1.

Applicants for admission to undergraduate programs or as special students may obtain forms from the Registrar of the University at Edmonton. Application forms for admission to the Faculty of Graduate Studies may be obtained only from the office of the Dean at Edmonton and must be returned to that office.

Transcripts

Well in advance of the deadline, every applicant for undergraduate admission must arrange to have **two** official transcripts of his previous educational record (high school and beyond) sent direct from the Department of Education or other institution maintaining such records to the Registrar at Edmonton. Applicants for admission to the Faculty of Graduate Studies should have their University transcripts sent to the Dean of that Faculty at Edmonton.

No definite and final ruling concerning admission and registration can be given until all certificates and transcripts of standing have been received by the Committee on Admissions. Faculty offices gladly consult with and advise students regarding programs of study, but all decisions are unofficial and tentative until documents have been received and evaluated by the Committee on Admissions.

Advanced Standing

Students from other universities may be admitted to advanced standing except in the combined courses. Extramural credits from recognized universities may be accepted under certain conditions, but such credits will not be considered beyond the first year of university work. (In the Faculty of Education credit to a maximum of four **junior** courses taken extramurally from another recognized university will be allowed, although the actual number will vary with the program.) Students who have taken the equivalent of university courses in some other manner may be excused such courses but will not be granted advanced standing in them. They will be required to substitute other courses in order to complete a program of normal weight at this university.

Each application will be dealt with on its merits. The University reserves the right to require applicants for advanced standing to write examinations at any level including that of matriculation.

The amount of advanced standing that may be granted is limited by the residence requirements of the University of Alberta, which provide that a student proceeding towards a first degree will normally be required to attend at least one academic year as a full-time student.

Visé Fees

A fee of $5.00 is charged for the evaluation of educational documents issued in Canada but outside Alberta; the fee is $10.00 for documents issued in other countries. Students entering the Faculty of Graduate Studies are exempt from visé fees.

REGISTRATION

Course Selection

Since there will be only three lecture periods per day, many classes will be in session at the same time. Students are urged to look carefully at the time-

tables displayed towards the end of this Calendar before selecting their courses.

Students are also advised to give priority to the compulsory courses and the laboratory courses in their programs. By so doing, they will minimize registration difficulties that may arise at a later date because of timetable conflicts.

Limitations on Registration

*1. Normally a student will be permitted to register for two courses in the Summer Session if his previous record of achievement is satisfactory.
2. There are, however, certain designated laboratory courses which may not be taken concurrently with other courses. This limitation, when it applies, is indicated immediately after the course description.
3. Under no circumstances will a student be permitted to register in more than two full courses in a Summer Session.
4. No student may offer for credit in any period of twelve consecutive months more than three courses taken by a combination of Summer Session, Evening Credit Program or late afternoon classes, and extramural study.
5. In the Faculties of Arts and Science no student, except by special permission of the Council of the Faculty, may offer for credit in any period of twelve consecutive months commencing September 1, more than five courses.

Advance Registration

Registration forms must be completed and returned in duplicate to the Registrar at Edmonton not later than April 30 (English 200, February 17) together with the registration fee. Cheques or money orders must be made payable to the University of Alberta.

Students, except those registered in the Faculty of Graduate Studies, whose registration forms are received, or postmarked, not later than April 1, will be granted a reduction in instruction fees of $5.00 per full course.

Students whose registrations have been approved will receive from the Registrar a statement of fees and later (in June), class admission cards.

Confirmation of Registration

On the first day of lectures, Thursday, July 2, all students must confirm their advance registration by reporting their presence to registration clerks **anytime** from 9:00 a.m. to 11:00 a.m. and from 12:00 noon to 2:00 p.m. at the main entrances of **any one** of the following buildings: Arts Building, **New** Education Building, and Lecture Wing V of the Mathematics-Physics and Chemistry Buildings. Special forms for this purpose will be mailed to students in June with their Class Admission Cards.

Students attempting to confirm their registrations after the appointed time may be refused permission. If permission is granted, a late penalty fee of $3.00 plus $2.00 per day will be assessed.

Change or Cancellation of Registration

After confirming his registration, a student may not change from one course

*In planning their class loads, students should bear in mind that there are no supplemental examinations for courses failed in a Summer Session.

to another, abandon a course, or withdraw from the Summer Session without first obtaining permission from his Dean or Director. This permission, in the form of a "Change of Registration" or "Withdrawal" slip, signed by the Dean or Director, must be presented to the Registrar before the change becomes official.

A student who abandons a course or withdraws from the Summer Session without completing the required forms will not be eligible for any refund of fees, nor for exemption from fees in the event that he has not paid them.

Payment of Fees

Upon payment of fees students will receive an identification card. Registration is incomplete until fees have been paid and is subject to cancellation unless payment has been made by the final date mentioned in the following regulations.

1. Fees should be remitted by cheque or money order payable at par to the University of Alberta—not to any officer of the University.
2. Fees are payable at the time of advance registration. If, for any reason, payment is deferred until after receipt of a fee assessment, fees together with the fee assessment card should be sent direct to the Bursar University of Alberta, Edmonton.
3. The last date for the payment of fees by undergraduate students is June 5. A penalty fee of $5.00 will be charged on any payment made or postmarked subsequent to that date and must be added to any remittance mailed or delivered to the University. If payment in full has not been made by July 9, registration will be subject to cancellation, and the student to exclusion from classes. There is no provision for partial payments.
4. The last date for the payment of fees by graduate students is June 5 or fifteen days after the date of assessment, whichever is the later. A penalty of $5.00 will be charged on any payments made or postmarked subsequent to that date.
5. In case of non-attendance all fees paid, except the registration fee will be refunded upon application to the Registrar.
6. If notice of cancellation of registration is received by the Registrar by July 9, all fees except the registration fee will be refunded. If notice is received subsequent to July 9, a pro rata charge from July 2 will be made and the balance refunded except that no refunds will be made where withdrawal or cancellation is subsequent to August 5.

FEE SCHEDULE

Undergraduate Programs

General Fees

Registration	$ 2.00
Students' Union: General	1.00
Building Fund	2.50
	$ 5.50
Yearbook Fee (optional at registration)	$ 6.00

Instruction Fees

Per Course	*$ 80.00
Per Half Course	** 40.00
Auditor's fee, per course (see "Classification of Students", page 10)	12.00

Graduate Programs

Students who have previously started M.Ed. programs will note that the method of assessing fees has been changed. Assessment of fee balances will be on the new method but this will not increase the total fee for any program that is completed in the normal time (three registrations). Those who register for Summer Session will, without registering for the winter session, be entitled to: (a) receive thesis direction from the division or department and use the library for twelve months, and (b) graduate at Spring Convocation.

General Fees

Registration	$ 10.00
Students' Union: General	1.00
Building Fund	2.50
	$ 13.50
Yearbook Fee (optional at registration)	$ 6.00

Instruction Fees

Students registered for the M.Ed. degree and who obtain residence credit at Summer Session (Applicable only to students on program before September, 1962)	$165.00
All graduate students who have paid the basic M.Ed. degree program fee in full (three registrations), for each additional registration in a Summer Session	$ 40.00
All other graduate students (per course)	$ 80.00

PREPARATORY STUDY

In view of the brevity of the Summer Session, it is expected that students will have mastered a substantial portion of the content of their courses prior to the opening of the session.

Study Outlines

Study outlines giving directions for preparatory work in each course will be sent to students as soon as, but not before, their registrations have been approved.

Textbooks

Titles of textbooks will be included in the study outlines. Students who will be attending the Summer Session at Edmonton should obtain their textbooks from the University Bookstore at Edmonton. (Textbooks carried by the University Bookstore at Calgary may not be identical with those required in courses offered at Edmonton.) Mail orders will be accepted only an a C.O.D. basis.

*$75.00 if advance registration is completed by April 1.
**$37.50 if advance registration is completed by April 1.

Students are advised to order textbooks required for pre-session study immediately after receiving outlines. Failure to do so may result in their being unable to obtain them in time to complete the pre-session study requirements.

Preliminary Examinations

Examinations on the prescribed preparatory study will be held during the first week of classes. If preparation proves to be inadequate, a student may be asked to withdraw from the course. This requirement makes it all the more necessary that registration be completed at an early date, textbooks secured, study commenced, and the work carried forward consistently.

ATTENDANCE

1. Regular attendance is expected of students in all courses. Students having an inordinate number of unexcused absences from a course may be refused permission to take the final examination.
2. Absences are counted from the first day of the session.
3. Students who are late for a lecture or laboratory period will be marked absent unless at the end of the period in question they account satisfactorily to the instructor for lateness.
4. (a) Students who are absent from two or more consecutive classes should report to the instructor upon their return.
   (b) Absence from term or final examinations. See paragraphs 5 and 6 of the next section (Examinations).
5. Students desiring leave of absence in a given course must apply to the Registrar. At the end of such period of absence, the student must present an absence form for the Registrar's signature.

EXAMINATIONS

1. **Final Examinations.** Final examinations will be held on Thursday and Friday, August 13 and 14.
2. **Distribution of Credits.** In each course where a final examination is held credit of not less than 30% and not more than 70% will be assigned to term work. The remaining credit in each course will be assigned to the final examination.
3. **Pass Marks.** For students proceeding towards an undergraduate degree the pass mark is 50% unless otherwise specified; in courses taken toward a graduate degree the pass mark is 65%.
4. **Debarment from Final Examination.** A student may be refused permission to write a final examination in a course on the recommendation of the department concerned and with the concurrence of the dean of his faculty in the following circumstances:
   (a) The student has an inordinate number of unexcused absences.
   (b) The student has neglected to do a substantial proportion of his written assignments in a course of which these are an essential feature.
   (c) The student has neglected to do a substantial proportion of the laboratory work in a science course.
5. **Absence from Term Examinations or Tests.** If a student has an unexcused absence from a term examination or test, the mark assigned to him will

be zero. However, in case of illness the student may be excused from writing the examination or test. To obtain this exemption he should proceed according to Regulation 4.(a) in the preceding section (Attendance). When exemption is granted the percentage allotted to the examination or test missed will be added to the percentage allotted to the final examination.

6. **Absence from Final Examinations.** Any student who is ill or suffering from severe domestic affliction is advised not to sit for a final examination. Instead he should advise the Registrar at once of the circumstances and should apply for a deferred final examination to be written at the time of the Winter Session finals the following April. Similar action should be taken by a student who, because of religious convictions or for other cogent reasons, is unable to write a final examination at the scheduled time. Such application will be referred to the student's dean or director for a final decision.

   If a student becomes ill or receives word of domestic affliction during the course of an examination, he should report at once to the Supervisor, hand in his unfinished paper and request that it be cancelled. Thereafter, if illness is the cause, he must go directly to the Infirmary so that any subsequent application for a deferred examination may be supported by a medical certificate. The Registrar should be notified of the circumstances in writing within forty-eight hours of the examination.

   Should a student write an examination, hand in his paper for marking, and later report extenuating circumstances to support his request for cancellation of his paper and for another examination, such request will not be entertained.

7. **Statement of Record.** After the Summer Session a statement of record will be mailed to each student at the home address indicated on his registration form.

8. **Re-appraisal of Final Examination Papers.** Since great care is taken in the marking of final examination papers, a student should apply for re-appraisal of a paper only if he has good reason to believe that a mistake has been made. Re-appraisals are dealt with by the head of the department in consultation with members of the staff. A request for re-appraisal must be made by letter to the Registrar within thirty days after the publication of results, accompanied by a fee of $10.00 for each paper. The fee will be refunded if the mark is raised from a failure to a pass, or from Class III to Class II or from Class II to Class I or by at least 5% within a passing grade.

10. **Deferred Final Examinations.** A student who has missed a final examination because of illness or domestic affliction or who is obliged to absent himself from an examination for some other compelling reason (including religious convictions) may apply for a deferred final examination to be written at the time of the Winter Session finals the following April.

11. **Examination Fees.**

    (a) **Final Examinations:** No fee is levied for final examinations written during the regular examination periods.

    (b) **Deferred Final Examinations:** A fee of $5.00 is charged for each deferred final written during regular supplemental examination periods. The fee

for special deferred finals requiring the setting of special papers is $10.00 per parer.

(c) **Outside Centers:** An additional fee of $5.00 per subject is charged for writing deferred final examinations in established Alberta centers other than Edmonton and Calgary.

LIVING ACCOMMODATION

Residences

New residences are now under construction and will be ready for occupancy prior to the opening of the 1964 Summer Session. Administrative details including rates have not yet been established but information will soon be available through the office of the Director of Housing, Lister Hall.

A limited amount of accommodation is available in St. Stephen's College and St. Joseph's College. Details can be secured by writing directly to the colleges.

Jurisdiction over the conduct of the students in the University residences during the Summer Session is vested in the Provost, the Wardens, and the men's and women's house committees authorized by the Deans' Council for this purpose.

Among the rules of discipline appears the following: "The use of, bringing or having liquor on University premises, including residences, is strictly prohibited."

Student Housing Service

While the University cannot accept responsibility for finding suitable accommodation it does provide a special listing service for the benefit of out-of-town students. Prior to the Summer Session, Student Housing Service prepares lists of available accommodation which may be consulted by students. The Housing Office is located in Lister Hall (Food Services Building). The telephone number is 433-1187.

Food Services

Full meal services, cafeteria style, are provided on the campus for the convenience of students. In addition the Snack Bar in the Students' Union Building is open during hours adapted to their needs.

STUDENT COUNSELLING SERVICES

The University provides a counselling service available at any time of the year to all University students and prospective students.

1. **Prospective Students.** A bulletin, "Information for Prospective University Students", has been prepared to answer the questions commonly asked. Interviews can be arranged at any time prior to the opening of the Summer Session.

2. **Counselling Services.** Students may make use of the service in regard to studies, vocational choice, personal and financial problems.

3. **Change of Faculty.** Students contemplating a change of school or faculty are advised to consult a counsellor. This should be done well before the opening of the session.

4. **Withdrawal from the University.** Any student who for any reason is contemplating withdrawal from the University should arrange an interview with a councillor and subsequently with his Dean or Director.
5. **Student Housing Services.** See preceding section on living accommodation.

STUDENT HEALTH SERVICES

A Student Health Service Fund is maintained by an annual appropriation from fee revenue. This fund provides for treatment of minor ailments only and cannot be expected to take care of prolonged or otherwise costly illness.

Students are urged to be in possession of the telephone number of the Infirmary (439-4991) and of the consulting hours of the Infirmary Physician. In cases of illness or emergence the nurse in charge should be called without delay.

TEACHER PLACEMENT SERVICE

The National Employment Service, which maintains an office in the University Administration Building, is prepared to assist teachers who are seeking employment with school boards. The service has listings of teacher requirements from school boards throughout the whole province. Summer School students are urged to register with N.E.S. on arrival so that interviewing schedules may be set up with visiting boards.

REDUCED RAILWAY AND BUS FARES

Students, instructors, and dependent members or their families travelling to the Summer Session from points in Canada are entitled to reduced fares. During the period of three days prior to the session they should purchase a regular one-way fare from their ticket agent and obtain a "Standard Convention Certificate". In order to be valid for the purchase of the return trip ticket at a reduced rate, this certificate must be signed by the Bursar.

EXTRACURRICULAR ACTIVITIES

Students are urged to remember that the extracurricular program of the Summer Session is rich in opportunities for the enjoyment of sports as well as social and educational activities.

1. **Sports:** Students who are interested should bring appropriate clothing and equipment for participation in fastball, bowling, tennis, badminton, golf, archery, swimming, hiking and possibly skating.
2. **Social:** Social activities including both informal and semi-formal dances, sing-songs, hymn-sings, afternoon teas, musical recitals, and dramatics.
3. **Educational:** The extracurricular educational program consists mainly of lectures delivered by speakers chosen for their competence in the fields in which they speak.

FALL CONVOCATION, 1964

Summer Session students who expect to qualify for a degree to be conferred at the Fall Convocation, 1964, should note carefully that announcements regarding the Convocation will be sent to their homes or permanent addresses as reported on their Application for Degree forms. It is the responsibility of these students to advise the Registrar of changes in their addresses.

THE FACULTY OF ARTS

The Faculty of Arts offers honors programs and a general program leading to the degree of Bachelor of Arts (B.A.), and also programs in the Fine Arts leading to the degrees of Bachelor of Fine Arts (B.F.A.) and Bachelor of Music (B.Mus.). It also offers courses in association with other faculties leading to a variety of professional degrees. For further details students should consult the Arts Calendar, which may be obtained from the Registrar.

Honors programs are not available in the Summer Session.

Students who are planning to begin work in the Faculty of Arts in the 1964 Summer Session should contact the office of the Dean before registering.

THE GENERAL PROGRAM

Attendance Requirement

A student proceeding to a Bachelor's degree in the Faculty of Arts will be required to complete a program of normal weight in at least one regular session, September to April. Exceptions may be made in the case of teachers who have at least two years' experience subsequent to receving permanent teaching certificates. Such students may meet the requirements for the degree of Bachelor of Arts by attendance in the Summer Session and the Evening Credit Program. They are warned that the University cannot undertake to offer in summer and evening sessions all the courses required for the Bachelor of Fine Arts or Bachelor of Music degree, or all the courses an individual may desire for the Bachelor of Arts degree.

Course Requirements for the B.A.

First Year

English 200 or 210; an Arts course; a laboratory Science course; two options; Physical Education.

Second Year

An Arts course; a Science course; three options.

Third Year

An Arts course; a Science course; three options.

Notes:—

1. Each student must include in his program a mimimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.A. degree must choose his principal subject of concentration in the humanities or in the social sciences.* To be awarded the B.A., the student must pass at least eight and not more than twelve courses in the humanities and the social sciences.

*Either the B.A. or B.Sc. degree may be taken with Mathematics as the principal subject of concentration. Students wishing the B.A. degree should consult the Department of Mathematics concerning a suitable sequence of courses.

Graduation Requirement

To be granted the B.A. degree, a student must present passing marks or better in a minimum of fifteen full courses, and an average of at least 60 per cent in all courses credited towards the degree after the first year.

B.A. AFTER B.ED.

Students who have qualified for the degree of B.Ed. may proceed to the degree of B.A. if they have met the matriculation requirements of the Faculty of Arts and can present credit in thirteen Arts or Science courses. They will be required to complete six additional senior Arts or Science courses, as prescribed by the Faculty of Arts, and attain an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Arts will be required to remove deficiencies; students with fewer than thirteen Arts or Science courses will be required to take additional courses.

Students who propose to secure the B.A. degree in this manner are advised to consult the Dean before registering in the Faculty of Arts.

B.A. AFTER B.SC.

Students who have qualified for the degree of B.Sc. may proceed to the degree of B.A. by completing a nine-course program as prescribed by the Faculty of Arts and attaining an average of 60% in these courses.

THE FACULTY OF SCIENCE

The Faculty of Science offers honors programs and general programs leading to the degrees of Bachelor of Science (B.Sc.), and Bachelor of Science in Household Economics. It also offers courses in association with other faculties leading to a variety of professional degrees. For further details students should consult the Science Calendar which may be obtained from the Registrar.

Honors programs are not available in the Summer Session.

Students who are planning to begin work in the Faculty of Science in the 1954 Summer Session should consult the Dean of the Faculty.

THE GENERAL PROGRAM

Attendance Requirement

A student proceeding to a Bachelor's degree in the Faculty of Science will be required to complete a program of normal weight in at least one regular session, September to April. Exceptions may be made in the case of teachers who have at least two years' experience subsequent to receiving permanent teaching certificates. Such students may meet the requirements for the degree of Bachelor of Science by attendance in the Summer Session and the Evening Credit Program. They are warned that the University cannot undertake to offer in summer and evening sessions all the courses required for the Bachelor of Science degree.

Course Requirements for the B.Sc.

First Year

English 200 or 210; an Art course; a Science course; two options.

Second Year

An Arts course; a Science course; three options.

Third Year

An Arts course; a Science course; three options.

Note:—

Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.

Graduation Requirement

To be granted the B.Sc. degree, a student must present passing marks or better in a minimum of fifteen full courses, and an average of at least 60 per cent in all courses credited toward the degree after the first year.

B.SC. AFTER B.ED.

Students who have qualified for the degree of B.Ed. may proceed to the degree of B.Sc. If they have met the matriculation requirements of the Faculty of Science and can present credit in thirteen Arts or Science courses, they will be required to complete six additional senior Arts or Science courses, as prescribed by the Faculty of Science, and to attain an average of 60% in

these courses. Students with incomplete matriculation for the Faculty of Science will be required to remove any deficiencies; students with fewer than thirteen Arts or Science courses will be required to take additional courses.

Students who propose to secure the B.Sc. degree in this manner are advised to consult the Dean before registering in the Faculty of Science.

B.SC. AFTER B.A.

Students who have qualified for the degree of B.A. may proceed to the degree of B.Sc. by completing a nine-course program as prescribed by the Faculty of Science and attaining an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Science will be required to remove any deficiency.

THE FACULTY OF EDUCATION

The Faculty of Education is organized for the professional training of teachers for elementary, junior high and senior high school grades, and for graduate study and research in the field of Education.

GENERAL INFORMATION

Summer Session Programs

In the Summer Session, the Faculty of Education in association with the Faculties of Arts and of Science offers courses appropriate to the following programs:

1. B.Ed. Program—Elementary Route
2. B.Ed. Program—Secondary Route
3. B.Ed. Program in Industrial Arts
4. B.Ed. Program in Vocational Education
5. B.Ed. Program for Holders of Approved Degrees
6. Advanced Study in Education

These programs are described in detail in the sections that follow.

Advanced Credits for Certificated Teachers

Certificated teachers who have had a year of teacher education and who have clear matriculation into the Faculty of Education will be given credit for the first year of a four-year B.Ed. program.

A maximum of three course credits will also be allowed in this program for courses completed in the summer sessions conducted by the Alberta Department of Education in the years 1935 to 1943 inclusive, one course credit being allowed for every 75 hours of certified attendance. Certificates covering these summer session credits should be forwarded for evaluation to the Dean, Faculty of Education, Edmonton.

Note:—

The granting of advanced credits for courses taken in Alberta Department of Education summer sessions will be discontinued after June 1, 1965.

Basic Graduation Requirements (Applicable to Summer Session Students)

1. To be granted the B.Ed. degree, a student must obtain a passing mark or better in each course and obtain an average of 60% in all courses credited toward the degree. (Those who transfer to the B.Ed. program, University of Alberta, with advanced standing will be required to maintain a 60% average on all courses completed at the University of Alberta toward the B.Ed. degree.)
2. The privilege of repeating a failed course will not be granted more than once.
3. The maximum number of additional examinations, including those in repeated courses, which a student may write for the completion of a B.Ed. degree program may not exceed by more than five the number of courses required for completion of the particular B.Ed. degree program.

Students admitted prior to January 2, 1963, will be allowed to graduate, provided they do so before June 30, 1966, by taking advantage of these graduation requirements or of those set forth in item 1, page 50 of the 1962-63 Calendar of the Faculty of Education.

Certification of Out-of-Province Teachers

Teachers holding certificates not issued by the Province of Alberta should apply directly to the Registrar, Department of Education, Administration Building, Edmonton, for an equivalent Alberta teaching certificate.

One requirement for making such certificates permanent in Alberta may be the successful completion of two courses at a University of Alberta Summer Session. The Registrar, Department of Education, will decide whether this is required. When such courses are prescribed they should be chosen in consultation with the Faculty of Education.

It is important that candidates who wish these courses to count for degree credit as well as for certification consult with the Faculty to make sure that they apply on a degree program. Candidates with the B.A. or similar degree may wish to begin the B.Ed. program for holders of approved degrees as mentioned above. Those with the B.Ed. degree who may wish to be considered for the M.Ed. program should elect education courses numbered over 500.

THE STANDARD ELEMENTARY B.ED. PROGRAM

Upon completion of the first two years, candidates are eligible for the Interim Standard E. Certificate, valid in Grades I to IX; completion of three years earns the Interim Professional Certificate, valid in Grade I to XII; completion of four years, the B.Ed. degree.

The following revised program came into effect September 1, 1963. Students who have already completed two years on their degrees will continue in accordance with requirements of the former program. Those who have not completed two years may, with the permission of the Dean, transfer to the new program if they think it is to their advantage to do so.

Both the revised and the former B.Ed. programs are given in this section.

Degree Program for Certificated Teachers

(Revised Elementary Route)

First Year

Credit granted on the basis of at least seven months of teacher education.

Second Year

1. English 200 or 210
2. Major
3. Major
4. Arts or Science option
5. Arts or Science option
6. Senior Education option

Third Year

1. Educational Psychology 476
2. Philosophy 240 or 246

3. Major
4. Approved Arts option in social science or history
5. Approved Arts or Science option

Fourth Year

1. Educational Foundations 492
2. Major
3. Arts or Science option
4. Senior Education option
5. Senior Arts or Science or Education option

Notes on the Program:—

1. The following courses, which are being offered in the 1964 Summer Session, may be presented as approved options under item 4 of the program for the third year:
   Anthropology 202, Economics 200, History 201 and 370, Geography 201, Political Science 200 and 320.
2. Graduation Requirements:
   (a) An average of at least 60 per cent on all courses taken at the University of Alberta.
   (b) Students must include in their programs an approved Arts or Science option from each of two of the following six fields: Arts, drama, mathematics, music, physical education, and science.

   The following courses, which are being offered in the 1964 Summer Session, may be presented in fulfilment of requirement 2(b):
   Art 230; Drama 360; Mathematics 264, 274; Music 210; Physical Education 200; Chemistry 230; Geography 201; Physics 240; Zoology 220.

Elementary Route Major Fields

Candidates must select a major field of study. Courses are to be chosen according to the patterns listed below:

I. Art
1. Art 200
2. Art 230
3. Art 240
4. Ed. CI 310

II. English
1. English 288
2. English 398
3. Approved Senior English or Linguistics
4. Ed. CI 322 or 338

III. Early Childhood Education
1. An approved fine arts
2. English 398
3. Physical Education 200 or Drama 360
4. Ed. CI 320 or 324

IV. French
1. French 201

2. French 330
3. Approved Senior French
4. Ed. CI 336

V. Mathematics

1. Mathematics 180 or 201 or 207
2. Mathematics 220 or 274
3. Mathematics 274 or 374
4. Ed. CI 328

VI. Music

1. Music 200
2. Music 300
3. Music 250 or 400
4. Ed. CI 314

VII. Physical Education

1. Physical Education 200
2. Physical Education 327 and 329
3. Physical Education 423 and 425
4. Physical Education 431 and one of P.E. 427 or 429

VIII. Science

1. } Two of: Botany 201; Zoology 220; Chemistry 230, 250; Physics 200.*
2. }
3. Astronomy 253 or Geography 201 or Geology 201
4. Ed. CI 332

*Students selecting a biological science in the first year must select a physical science in the second year, and vice versa.

IX. Social Studies

1. A basic course in any social science or history
2. Geography 201 or History 210 or Sociology 202 or an approved senior social science or history*
3. Approved senior social science or history*
4. Ed. CI 306

*A course sequent to one taken in a previous year.

Use of Options

Students should give careful consideration to the various opportunities provided by the Arts or Science option, the Education option, and the Senior Arts or Science or Education option in the Elementary Route program. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the elementary school.

The following are illustrative of the ways in which these courses may be patterned:

1. *Education of exceptional children in the elementary school*
   Ed. Psy. 354
   One of Ed. Psy. 450, 452, 454, 456, or 458
   One of Psychology 352 or 382 or Sociology 370
2. *Further study in the major field*
   Two Arts or Science courses in major field
   One supporting Education option
3. *Elementary School Libraries*
   Ed. CI 346
   English 398
   One supporting Arts or Education option

Degree Program for Certificated Teachers
(Former Elementary Route)

First Year

Credit granted on the basis of at least seven months of teacher education

Second Year

1. English 200 or 210
2. Social Science option
3. Laboratory science option
4. Arts or Science option
5. Senior Education option
6. One of Art 230, Ed. CI 234, Music 200 or 210

Third Year

1. Educational Psychology 476
2. Philosophy 240, 260, 352, or 354. (Philosophy 242, 246 or 356 may be offered by Roman Catholic students)
3. Senior Education option
4. One of English 398, Art 230, Ed.CI 234, Music 200, or Music 210
5. Arts or Science option

Fourth Year

1. Educational Foundations 492
2. Senior Arts or Science or Education option
3. Senior Arts or Science option
4. Senior Arts or Science option
5. Senior Arts or Science option

Graduation Requirements

To qualify for the B.Ed. degree, Elementary Route, students must:

1. Include in their programs: English 398; two courses in science and/or mathematics; two courses in the social sciences, one to be in Canadian history; one course in art; one course in music.
2. Obtain second class standing or better in no fewer than **six** courses, of which **four** must be senior courses.

THE STANDARD SECONDARY B.ED. PROGRAM

Upon completion of the first two years, candidates are eligible for the Interim Standard S Certificate, valid in Grade IV to XI; completion of three years earns the Interim Professional Certificate, valid in Grades I to XII; completion of four years, the B.Ed. degree.

The following revised program came into effect September 1, 1963. Students who have already completed two years on their degrees will continue in accordance with requirements of the former program. Those who have not completed two years, may with the permission of the Dean, transfer to the new program if they think it is to their advantage to do so.

Both the revised and the former B.Ed. programs are given in this section.

Degree Program for Certificated Teachers
(Revised Secondary Route)

First Year

Credit granted on the basis of at least seven months of teacher education.

Second Year

1. Major
2. Major
3. Education CI Methods
4. English 200 or 210
5. Arts option in Social Science or History
6. Major
7. Major or Arts or Science option

Third Year

1. Educational Psychology 476
2. Philosophy 240 or 246
3. Major
4. Major or Arts or Science option
5. Senior Education option

Fourth Year

1. Educational Foundations 492
2. Major
3. Senior Education option
4. Major or Arts or Science option
5. Major or Arts or Science option

Notes on the Program:—

1. At least three courses in the major field must be completed by the end of the second year.
2. Graduation Requirement: An average of at least 60% on all courses taken at the University of Alberta.

Secondary Route Major Fields

Each candidate must select a major field of study. Courses are to be chosen according to the patterns listed below.

Major Field	Prescribed Core	Supporting Courses
I. English	1. English 288 2. English 395 3. 4. Two of English 332, 356, 364, 373, 380, 383, 388, 392, 393, or 396 5. Any senior English course not selected in 3 or 4 above or Drama 360	6. 7. Any two senior English courses or Two approved courses in history, foreign language, the fine arts or classics
II. French	1. French 201 2. French 330 3. French 350 4. One of French 360, 370, 375, 380, or 399 5. French 400	6. 7. Any one of the courses listed under 4 and a senior Arts option or Two approved courses in history, English, or other languages
III. German	1. German 200 2. German 330 3. German 350 4. 5. Two senior German courses	6. 7. Any senior German course and a senior Arts option or Two approved courses in history, English, or other languages
IV. Latin	1. Latin 200 2. Latin 300 3. Latin 353 4. Latin 354 5. Latin 355	6. Classics 350 or 351 7. Roman history 353 or a senior Latin course or Two approved courses in history, English, or other languages
V. Other Foreign Languages	1. 2. 3. 4. 5. Any five approved courses	6. 7. Two approved courses in history, English or other languages
VI. Social Studies	1. History 201 2. History 370 3. Geography 201 4. Geography 300	5. 6. 7. Three approved social science courses or history one of which must be in a field other than history or geography

Major Field	Prescribed Core	Supporting Courses
VII. Mathematics	1. Mathematics 180 or 201 or 207 2. Mathematics 220 or 274 3. Mathematics 274 or 374 4. Approved Senior Mathematics 5. Statistics 255	6. ⎫ Two senior mathematics 7. ⎭ courses or Two approved courses in a related field
VIII. Biological Sciences	1. Zoology 220 2. Botany 201 3. Chemistry 230 4. Chemistry 350 5. An approved senior Zoology course	6. An approved senior Botany course 7. An approved course in a biological or related science
IX. Physical Sciences*	1. Chemistry 230 2. Mathematics 207 or 201 3. Physics 200 or 240 4. Chemistry 350 5. An approved senior Physics course	6. An approved senior physics or chemistry course 7. An approved course in mathematics or An approved course in a physical science
X. Fine Arts **Art**	1. Art 200 2. Art 230 3. Art 240 4. Art 250 5. One of: Art 300, 330, 400 or Philosophy 350	6. ⎫ Two approved options 7. ⎭ which may be sequent courses in a field. See section, "Use of Options", below.
Music	1. Music 200 2. Music 300 3. Music 400 (or 250 with approval) 4. ⎫ Any two of Music 250, 5. ⎭ 400, 311, 350, or 450 or Philosophy 350	6. ⎫ Two approved options 7. ⎭ which may be sequent courses in a field. See section, "Use of Options", below.
Drama	1. Drama 250 2. Drama 480 3. ⎫ Two of Drama 360, 300, 4. ⎭ 400, or 350 5. Philosophy 350 or a senior course in drama	6. ⎫ Two approved options 7. ⎭ which may be sequent courses in a field. See section, "Use of Options", below.

*Careful attention should be given to the mathematics prerequisites or corequisites for physics courses.

Major Field	Prescribed Core	Supporting Courses
XI. Household Economics	1. Household Economics 202 2. Household Economics 210 3. Household Economics 460 4. Household Economics 453 and 303 (half courses) 5. Household Economics 350	6. Chemistry 250 or 350 7. House Ec. 464 or Two approved options in a related field
XII. Business Education		
(a) Secretarial	1. Ed. Bus. 346 or 246 and 345 2. Ed. Bus. 348 or 248 and 347 3. Accounting 200 4. Ed. Bus. 350 5. Business Law 310	6. } Two approved options 7. } in a related field
(b) Accounting-Clerical	1. Ed. Bus. 346 or 246 and 345 2. Accounting 200 3. Ed. Bus. 350 4. Business 202 or 300 or approved alternative 5. Business Law 310	6. } Two approved options 7. } in a related field

Note: Normally students will present 1. and 2. on one of the above patterns as prerequisites to Ed. CI 282. However, students who have selected 246 or 248 may, with the approval of the instructor, carry 345 or 347 as a corequisite to Ed. CI 282.

Use of Options

Students should give careful consideration to the various opportunities provided by the two Arts/Science Options and the two Education Options in the Secondary B.Ed. program. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the Secondary School.

The following are illustrative of the ways in which these courses may be patterned:

1. *Guidance in the Secondary School*
   - Two of Ed. Psy. 308, 310, or 478
   - *and*
   - Two of Soc. 360, Soc. 370, Psych. 352, or Psych. 383
   - *or*
   - Statistics 255 and two of Soc. 341, Soc. 343 or Psych. 336
2. *Further Specialization in Teaching Field*
   - Two Arts or Science courses in the major field
   - One advanced Curriculum and Instruction course
   - One supporting Education option

3. *Physical Education in the Secondary School*

   { Physical Education 232 and 332
   { Two supporting Education options

4. *Teaching in the Junior High School*

   { Two Arts or Science options (selected to give breadth)
   { Two Education options

Other patterns will be available in library services, speech, special education, etc.

Students are urged to plan the patterning of these courses in consultation with the Dean or the Department Head.

Degree Program for Certificated Teachers
(Former Secondary Route)

First Year

Credit granted on the basis of at least seven months of teacher education

Second Year

1. Major
2. Major
3. Sociology 202
4. English 200 or 210
5. Education CI 280
6. Major
7. Major

Third Year

1. Educational Psychology 476
2. Philosophy 240, 260, 352, or 354 (Philosophy 242 or 246 or 356 may be offered by Roman Catholic students)
3. Senior Education option
4. Senior Arts or Science (major)
*5. Junior or senior Arts or Science option

Fourth Year

1. Educational Foundations 492
2. Senior Education option
3. Senior Arts or Science (major)
4. Senior Arts or Science (major or minor)
5. Senior Arts or Science option

Graduation Requirements

To qualify for the B.Ed. degree, Secondary Route, students must:

1. Include in their programs a Division C option (mathematics or science). A laboratory science is recommended.
2. Obtain second class standing or better in no fewer than **six** courses, of which **four** must be senior courses.

---

*This must be a Science or mathematics course for those whose programs have not yet included such an option. (See Item 1 under "Graduation Requirements".)

THE B.ED. IN INDUSTRIAL ARTS

(Special Program for Teachers of General Shop Programs)

The following is a new program introduced in 1963 by the Faculty of Education to meet the needs of teachers of General Shop Programs. It is available only at Edmonton. Teachers already embarked on other B.Ed. programs may transfer to this program if they wish to do so.

First Year

1. Ed. IA 203 and Ed. Adm. 261
2. Ed. Psy. 276
3. English 210
4. Mathematics 207 or 201
5. Ed. IA 260
6. Physical Education 218 or 228

Second Year

1. Chemistry 230
2. Ed. CI 250
3. Physics 240
4. Sociology 202
5. Ed. IA 270

Third Year

1. Ed. Psy. 476
2. Philosophy 240 or 246
3. Physics 340
4. Ed. IA 360
5. Ed. IA 370

Fourth Year

1. Ed. Fdn. 492
2. Sociology 390
3. Ed. IA 350
4. Ed. IA 460
5. Ed. IA 470

Graduation Requirement: An average of at least 60 per cent on all courses taken at the University of Alberta.

THE B.ED. IN VOCATIONAL EDUCATION

First Year

1. Trade training as verified by a recognized Certificate of Qualification as a Journeyman for a designated trade or equivalent for a non-designated trade. The trade qualification is to be approved by an admissions sub-committee comprised of the Dean of the Faculty of Education, the Head of the Department of Industrial and Vocational Education, the University Admissions Secretary, the Chairman of the Provincial Apprenticeship Board, the Supervisor of Vocational Education of the Department of Education.
2. Experience in a trade or industry calling for the trade training held by the candidate, this also to be verified by the admissions sub-committee.

Second Year

1. Ed. Voc. 203 and Ed. Adm. 261
2. Ed. Psy. 276
3. English 210
4. Ed. Voc. 280
5. Ed. CI 250

Third Year

1. Ed. Psy. 476
2. Philosophy 240 or 242
3. Ed. Voc. 350
4. Junior Arts or Science option
5. Junior Arts or Science option

Fourth Year

1. Ed. Fdn. 492
*2. Ed. Voc. option
3. Senior Arts or Science option
4. Senior Arts or Science option
5. Senior Arts or Science option

Notes on the Program:—

1. One Arts or Science sequence to be directly related to vocational education.
2. One Arts or Science sequence to provide an element of general education.
3. Graduation Requirement: An average of at least 60 per cent on all courses taken at the University of Alberta.

B.ED PROGRAMS FOR HOLDERS OF APPROVED DEGREES

General Requirements (Applicable to all programs)

1. Students following these programs are required to complete one year of intramural attendance as full time students before they will be recommended for a teaching certificate.
2. Students entering these programs lacking credit in the prerequisites for Ed. Psy. 476 or Ed. Fdn. 492 or both will be required to remove deficiencies with the result that their degree programs will total thirteen or fourteen courses. Such students, however, will be permitted to register in special six-course programs that will lead to the Standard E or S Certificate. For further details consult the Education Calendar, 1963-64.
3. The holders of an approved Honours or Master's degree may qualify for the B.Ed. degree by completing the first nine of the required courses and meeting the graduation requirements.
4. Graduation Requirements:
   (a) An average of at least 60 per cent on all courses taken at the University of Alberta and credited towards the degree.
   (b) Students in these programs may not write more than two supplemental examinations for the purpose of obtaining passing marks or raising the average to 60 per cent.

(c) Students admitted prior to Jan. 2, 1963, will be allowed to graduate, provided they do so before June 30, 1965, by taking advantage of these graduation requirements or of those set forth in items 5 or 6 in the the Calendar of the Faculty of Education for 1962-63.

Program for Teachers in the Secondary School

1. Ed. Adm. 461
2. Ed. Psy. 476
3. Ed. CI 450
4. Ed. Fdn. 492
5. Education Method
6. Ed. Fdn. 414 or Ed. Psy. 478

(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate)

7. Ed. Psy. 478 or Ed. Fdn. 414
8. } Approved senior Education options
9. }
10. } Approved senior Arts or Science options
11. }
12. }

Notes on the Program:—

1. Students who present a degree which does not contain the equivalent of a major as required in the regular secondary route B.Ed. will be required to make up the deficiency before proceeding with this program.
2. Certificated Candidates (Jr. E. or equivalent) will complete items 2, 4 and 5 above for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 12 (inclusive) of the program.
3. Provision can be made in the program for further specialization in subject fields, guidance and counselling, library services, and the like.
4. Students interested in qualifying for a Master's degree rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements for graduate study.

Program for Teachers in the Elementary School

1. Ed. Adm. 461
2. Ed. Psy. 476
3. Ed. CI 400
4. Ed. Fdn. 492
5. Ed. CI 402
6. Ed. CI 404

(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate)

7. }
8. } Approved senior Education options
9. }

(*Continued next page*)

10.
11. } Approved senior Arts or Science options
12.

Notes on the Program:—

1. Students who present a degree which does not contain course work suitable for teaching in the elementary school will be required to make up the deficiency before proceeding with this program.
2. Certificated Candidates (Jr. E. or equivalent) will complete items 2 and 4 for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 12 (inclusive) of the program.
3. Provision can be made in the program for specialization in subject fields, primary education, reading, education of exceptional children and the like.
4. Students interested in qualifying for a Master's degree rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements for graduate study.

Program for Vocational Education Teachers

1. Ed. Adm. 461
2. Ed. Psy. 476
3. Ed. Voc. 480
4. Ed. CI 450
5. Ed. Fdn. 492
6. Ed. Voc. 404

(Satisfactory completion of these six courses permits the student to obtain the interim Professional Certificate)

7.
8. } Senior Education options
9.

10.
11. } Senior Arts or Science options
12.

Notes on the Program:—

1. Candidates must hold a Journeyman's Certificate or have had preparation and experience recognized by the University as equivalent.
2. Certificated Candidates (Jr. E. or equivalent) will complete items 2, 3, 5, and 6 for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 12 (inclusive) of the program.
3. Provision can be made in the program for further specialization in subject fields, guidance and counselling, library services, and the like.
4. Students interested in qualifying for a Master's degree rather than for the B.Ed., following the Professional year, should consult the appropriate department regarding requirements for graduate study.

ADVANCED STUDY IN EDUCATION

Graduate Diploma Programs in Education

The Faculty of Education sponsors a series of diploma programs providing additional special qualification in designated areas. Admission to the Graduate Diploma Program will be granted to holders of an approved degree and a Professional (in some Departments the Permanent Professional) Teaching Certificate or its equivalent. Normally, courses taken prior to the 1963 Summer Session may not be credited toward the Diploma unless the student is currently a candidate for the M.Ed. degree. Students who now hold the M.Ed. degree may not obtain the Diploma on the basis of course marks obtained on the M.Ed. degree program. Courses credited toward the diploma may not also be credited toward the B.Ed. degree. The pass mark for courses to be credited toward the Diploma is 65%. Residence requirements for the Diploma may be met in consecutive summer sessions or in a winter session.

Diploma programs are offered by all Departments of the Faculty. Enquiries should be directed to the office of the Department concerned.

Graduate Degrees in Education

All candidates for advanced degrees register with the Faculty of Graduate Studies which administers graduate programs throughout the University.

In the Faculty of Education graduate work is offered for the preparation of teachers, supervisors, guidance workers, administrators and other educational specialists, and may lead to the degrees of Master of Education, Doctor of Education and Doctor of Philosophy. Candidates for these advanced degrees specialize in terms of the departmental organization of the Faculty of Education as follows:

Department of Elementary Education: curriculum and instruction in kindergarten and elementary education. Head—Dr. W. H. Worth.

Department of Secondary Education: curriculum and instruction in secondary education. (Grades VII - XII). Head—Dr. L. W. Downey.

Department of Educational Foundations: philosophy, sociology, and history of education. Head—Dr. B. E. Walker.

Department of Educational Psychology: child and adolescent psychology, educational psychology, guidance, mental hygiene, special education, clinical psychology, tests and measurements. Head—Dr. G. M. Dunlop.

Department of Educational Administration: school administration (elementary and secondary), general supervision, school finance and business administration, chief administrative roles. Head—Dr. A. W. Reeves.

Department of Industrial and Vocational Education: Industrial Arts and Vocational Education. Head—Dr. H. R. Ziel.

In order to meet the needs and interests of candidates, the departments permit considerable flexibility in the programs leading to advanced degrees. In general, students pattern their courses from the offerings of the department of their choice supplemented by approved courses from other departments of the University. Normally a candidate for the master's degree must present a program consisting of six courses and a minor thesis, and is required to spend at least one academic year in study and research in residence at the University

of Alberta. A candidate for the doctor's degree (if he already holds a master's degree) is normally required to spend two academic years in study and research in residence at the University of Alberta.

Graduate courses in education are offered in both the regular and the summer sessions.

Initial Procedure: Students who wish to inquire about graduate programs should address all preliminary inquiries to the Dean of the Faculty of Graduate Studies, University of Alberta, Edmonton.

After a student has decided upon an area of specialization, he should communicate directly with the appropriate department head and, if possible, arrange for an interview. By this means the student's eligibility will be determined and further information given about the degree programs available in the Department.

Prospective candidates should also refer to the section of this Announcement which deals with the Faculty of Graduate Studies.

Special Students

A student holding a B.Ed. degree or the equivalent and not desiring to register for a graduate degree or not meeting all the requirements for admission to the Faculty of Graduate Studies, may register in the Faculty of Education as a **special** student.

LEADERSHIP COURSE FOR SCHOOL PRINCIPALS

A special Leadership Course for School Principals will be held in Concordia College as part of the 1964 Summer Session.

The course has been developed by the Alberta Trustees' Association, the Alberta Teachers' Association, the Alberta School Inspectors' Association, the Alberta Department of Education, and the Faculty of Education in an effort to improve the quality of leadership at the school level.

It will be a seminar type of activity with the program built around the interests and concerns of the course members. While the course is under the official direction of the Faculty of Education, it will not carry degree credit nor will there be any examinations.

Participation will be limited to 70 experienced principals sponsored by their school boards. The cost per member will be payable by the employing school board. It is expected that course members will live in residence at Concordia College for the two-week period.

Course members will be selected by the end of February. Interested principals should consult with their local superintendents and/or school boards for further details. Other information as needed may be obtained by writing to The Director, Leadership Course for School Principals, Division of Educational Adminstration, Faculty of Education, University of Alberta, Edmonton.

FACULTY OF GRADUATE STUDIES

The Faculty of Graduate Studies administers programs leading to the degrees of Master of Arts, Master of Education, Master of Science, Doctor of Education and Doctor of Philosophy, and makes recommendations for granting the degrees of Doctor of Science and Doctor of Letters. Graduates who have not been accepted as candidates for degrees may register as "conditional" or "probationary" graduate students if they are eligible and desirous of seeking admission to candidacy at a later date. "Special" graduate students may also be accepted in the Faculty.

Students proposing to do graduate work in the Summer Session leading to the M.A., M.Ed., and M.Sc. degrees should familiarize themselves with the regulations and procedures set forth in the Calendar of the Faculty of Graduate Studies, which may be obtained from the Registrar. A few of the more important general regulations are given below.

Admission

Application for admission to the Faculty of Graduate Studies must be filed not later than April 1 on forms supplied by the Dean of that faculty. A graduate of another University must arrange with the Registrar of that institution to forward two transcripts of his academic record to the Dean of the Faculty of Graduate Studies prior to April 1. The Dean may require the applicant to furnish an official description of the content of the courses listed on the transcript.

Registration

An applicant accepted by the Faculty as a candidate or provisional candidate for an advanced degree or as a "probationary" or "conditional" graduate student, is required:

(a) to register not later than April 30 if he proposes to work on his program in the Summer Session;

(b) to register either for the Summer Session or the Winter Session if he plans to use the library or obtain direction from a department or division during the following twelve months;

(c) to register for the session in which he expects to complete his degree program, unless he has been registered in the immediately preceding Winter Session or Summer Session;

(d) to file with each set of registration forms a program of studies signed by the head of the department or division responsible for his graduate study program. (Registration and program forms may be obtained from the office of the Dean of the Faculty of Graduate Studies and must be returned to that office when completed.)

Thesis and Oral Examination

A candidate planning to graduate at the Fall Convocation must submit his thesis not later than September 25 and pass an oral examination not later than October 11.

SUMMER SCHOOL OF LINGUISTICS

In response to a request from the Canadian Linguistics Association, the University will again conduct a Summer School of Linguistics during the 1964 Summer Session. In so doing, the University recognizes the growing need for linguistically trained scholars, teachers, and government personnel. It is expected that the Summer School of Linguistics will be of interest not only to those who wish to embark on or continue a study of Linguistic Science as a major subject but also

(a) to teachers of English and foreign languages in high schools, colleges, and universities who wish to apply to language teaching the methods and results of modern linguistic science;

(b) to advanced undergraduates and graduate students in such fields as English, Modern and Classical Languages, Anthropology, Philosophy, Psychology, and Sociology who may wish to combine the study of Linguistics with their major subject; and

(c) to others such as museum and library staff, civil servants, and missionaries to whom a knowledge of linguistics is of value.

The following courses, described elsewhere in this Announcement, will be offered. All of these courses may be taken for University credit.

Anthropology 305	— Culture and Language
Education CI 438	— Teaching English as a Second Language
English 388	— History of the English Language
English 389	— Modern English Grammar
Linguistics 400	— General Linguistics
Linguistics 420	— Phonemics, Morphemics and Syntax
Linguistics 430	— Contrastive Linguistics
Linguistics 460	— Field Methods in Linguistics
Linguistics 470	— American Indian Linguistics

Regulations concerning admission, registration, fees, pre-session study and examinations are the same as those for other courses offered in the Summer Session and may be found in the General Section of this Announcement.

A brochure giving full details concerning the Summer School of Iinguistics is available on request from the Summer Session office. Additional information may be obtained from Dr. Ernest Reinhold, Director, Summer School of Linguistics, University of Alberta, Edmonton, Alberta, Canada.

DETAILS OF COURSES

Notes:—

1. The University reserves the right to restrict registration in, or to withdraw, any of the courses here outlined.
2. The number of hours of instruction per week is shown at the top of each course description. The first figure in a set of two indicates lecture-hours; the second, laboratory hours. The letter "L" attached to a figure signifies lecture-laboratory-hours, and the letter "S" seminar-hours.
3. Only courses marked with an asterisk (*) may be presented for credit on B.A. or B.Sc. degrees.

ACCOUNTING

***Accounting 200**—H. E. Donley (10-8)

Management Accounting—The language of accounting, forms of business organizations, and accounting implications stressing managerial requirements.

ANTHROPOLOGY

***Anthropology 202** (10-0)

Introduction Anthropology—An introduction to the field of anthropology, including paleontology, race, human prehistory, linguistics and enthnology.

***Anthropology 305** (10-0)

Culture and Language—An inquiry into the nature of human communication, its cultural conditions and consequences. Special attention will be given to the interrelations of the linguistics structures and habitual modes of behaviour and thought of various societies.

***Anthropology 350**—Sally Snider (10-0)

Indians of North America—A survey of the cultural and linguistic areas of aboriginal North America, and including a comparative and historical study of technology, social organization, economic systems, religions, art and language. Some emphasis will be given to the Indians of Canada.

ART

***Art 230**—J. B. Taylor, B. Pragnell, G. Thomas and Ruth Ford (20L)

Fundamentals of Design—The study and practical application of principles of composition and picture-making, methods of construction in design, and the use of conventional and abstract forms.

***Art 240**—D. D. Barry (20L)

Fundamentals of Drawing—Theory and practice, analysis of masters' drawings; study of line, form, light and shade; portrait and figure construction; life drawing, using both long and quick poses.

***Art 400—T. J. Peart** (10-0)

European Art, 17th to 19th Century—A study of the French, Dutch, Spanish, German and English periods between the end of the 16th century and the end of the 19th century.

Prerequisite: Art 200 (for Arts and Science students only).

BUSINESS LAW

Business Law 310 (10-0)

Commercial Law—An introduction to the study of Commerical Law with special reference to the law of contracts; Bills of Sale, Chattel Mortgages and conditional sales; sales of goods; bulk sales; contracts of hiring; contracts of carriage including bills of lading; negotiable instruments; guarantees; real property; commercial associations including companies, partnership and agency; master and servant.

CHEMISTRY

***Chemistry 230—A. J. Sukava** (10-12)

Inorganic Chemistry—Lectures: The fundamental concepts of Chemistry as applied to the elements and their compounds.

Laboratory: The preparation of some compounds; quantitative chemistry, and semi-micro qualitative analysis.

Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CLASSICS

***Classics 352—P. J. Buck** (10-0)

History of Ancient Greece: The Influence of the Greek Genius on the Western World—The story of the Hellenic world from its beginnings in the Minoan-Mycenaean civilizations of Crete and Greece until the time of Alexander the Great with special attention to the political organization of the city-state and the beginnings of democracy, and to cultural and economic development.

DRAMA

***Drama 360—C. T. Peacocke** (10-0)

Voice and Speech—This is an introductory course in speech with emphasis upon oral interpretation. The first part of the course will be devoted to a discussion of the importance of our spoken language, a study of the vocal mechanism and causes of poor phonation, and practice in the production of voice and speech. The second part will be concerned with the expression of personality through speech, audience psychology, oral interpretation and practice. Some reference will be made to other speech situations.

***Drama 400—F. F. Bueckert** (10-0)

The Modern Theatre—The development of the modern theatre from Ibsen to the present day. The aesthetics of the theatre. A considerable amount of outside reading will be assigned throughout the session, including the reading of plays and critical essays.

ECONOMICS

***Economics 200**—I. Moravcik (10-0)

Principles of Economics—A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy.

Prerequisite for all senior economics courses except 310, 311, and 330.

***Economics 320**—T. L. Powrie (10-0)

International Trade—An analysis of the theoretical basis of international trade, the theory of balance of payments adjustments, and related problems. A survey of the development of the economy of the North Atlantic community in the modern period, with special emphasis on attempts to broaden trade and investment since the end of the Second World War.

Prerequisite: Economics 200 or 302.

***Economics 330**—P. Denis (10-0)

Labor Problems—A survey of the nature of labor economics and labor problems, including the various approaches of organized workers and employers to these problems. The approach of government to labor problems, including industrial disputes and social security. Applications of economics analysis to wages, unemployment and related problems.

EDUCATION: Educational Administration

Ed. Adm. 461—H. C. Melsness (10-0)

Educational Administration—A basic course in educational administration dealing with topics of special significance to the classroom teacher.

NOTE: In the Summer Session students may take Ed. Adm. 461 in place of Ed. Adm. 261, which is not offered.

Ed. Adm. 525-563—W. D. Neal (10-0)

Administration of Educational Personnel and Program—Personnel policies, including such topics as consultation, appraisal, in-service education, staffing, morale; patterns of school organization, curriculum adaptation, staff utilization, pupil personnel practices, program evaluation, learning materials.

NOTE: Ed. Adm. 525 and Ed. Am. 563, which are taught separately as half-courses in the winter session, are combined as a full course in the Summer Session.

Ed. Adm. 559-561—A. W. Reeves (10-0)

Educational Administration: Principles and Canadian Practice—Evolving concepts in school administration; organization and operation of schools in Canada.

NOTE: Ed. Adm. 559 and Ed. Adm. 561, which are taught separately as half-courses in the winter session, are combined as a full course in the Summer Session.

Ed. Adm.—Thesis—J. H. M. Andrews (10S)

A non-credit seminar for M.Ed. students working on theses proposals. Restricted to candidates admitted to program prior to the 1963 Summer Session. Registration only with permission of the instructor.

EDUCATION: Business

Ed. Bus. 246—L. Dawson (10-10)

Teaching of Typewriting—Typewriting, and the teaching of typewriting in the secondary school. Open to students not eligible for admission to Ed. Bus. 346.

Ed. Bus. 345—G. A. Garbutt (0-10)

Typewriting Practice.

NOTE: Required of candidates who present Ed. Bus. 246 for credit on the major in business education.

Ed. Bus. 346—G. A. Garbutt (10-10)

Teaching of Typewriting—Advanced typewriting, and the teaching of typewriting in the secondary school.

Prerequisite: Typewriting 20 of the high school with B standing, or the Junior Certificate in Typewriting.

NOTE: Students who do not show sufficient competence in typewriting will be required to register in Ed. Bus. 246. Not open to students who hold credit in Ed. Bus. 246.

Ed. Bus. 350—M. W. Campbell (10-10)

Office Training—Office organization and services with special reference to business communication and filing procedures. Introduction to business machines.

Prerequisite: Ed. Bus. 246 or equivalent.

EDUCATION: Curriculum and Instruction

Ed. CI 221—Jean Young (10-2) (2nd 3 weeks)

Curriculum and Instruction in Elementary School Reading.

Ed. CI 237—Jean Young (10-0) (1st 3 weeks)

Curriculum and Instruction in Elementary School Language.

Ed. CI 254—J. Regan (10-0)

Curriculum and Instruction in Secondary School English.

Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 266—J. J. Nearing (10-0)

Curriculum and Instruction in Secondary School Social Studies.

Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 278 (10L)

Curriculum and Instruction in Secondary School Physical Sciences.

Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 286—Grace Duggan (10-0)

Curriculum and Instruction in Secondary School Household Economics.
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 292 (10-0)

Curriculum and Instruction in Secondary School Music.
Prerequisites or corequisites: Three full courses on the major pattern.

NOTE: Ed. CI 292 may be presented as a Senior Education option by students who are majoring in fields other than music.

Ed. CI 294 (10-0)

Curriculum and Instruction in Secondary School Drama.
Prerequisites or corequisites: Three full courses on the major pattern.

Ed. CI 298—G. M. Elliott (10-0)

Curriculum and Instruction in Secondary School Physical Education.
Prerequisites or corequisites: Two full courses in physical education.

Ed. CI 320—Grace McLellan (10-0)

Reading at the Primary Level.
Prerequisite: Ed. CI 221 or equivalent, and at least one course on the major pattern.

Ed. CI 328—L. D. Nelson (10-0)

Mathematics in Elementary Education.
Prerequisite: Ed. CI 227 or equivalent, and at least one course on the major pattern.

Ed. CI 332—S. Trieger (10-0)

Science in Elementary Education.
Prerequisite: Ed. CI 231 or equivalent, and at least one course on the major pattern.

Ed. CI 338—R. D. Armstrong (10-0)

Language in Elementary Education.
Prerequisite: Ed. CI 237 or equivalent, and at least one course on the major pattern.

Ed. CI 342—Dorothy Higginbotham (10-0)

Speech in the Elementary School.
Prerequisite: A teaching certificate.

Ed. CI 346—Alma Webster (10-0)

School Libraries.
Prerequisite: A teaching certificate.

Ed. CI 362—J. Shaw (10L)

Audio-Visual Education—Theory of audio-visual education; types of communications media available for instructional purposes; principles and techniques of teching with such media; examination and preparation of audio-visual materials; experience in the operation and care of specialized equipment.

Ed. CI 438—R. Wardhaugh (10-0)

Teaching English as a Second Language.

NOTE: Students who register in this course are strongly advised to register concurrently in English 288, 388, or 389 if they do not already hold credit in one of these courses or their equivalent.

Ed. CI 468—G. L. Berry (10-0)

Advanced Curriculum and Instruction in Secondary School Social Sciences. Prerequisites: Two courses in social sciences, and Ed. CI 266 or 466 or written consent of the Department of Secondary Education.

NOTE: Consent of department where required must be filed with registration form.

Ed. CI 522—Helen Huus (10-0)

Organization and Supervision of the Reading Program.

Prerequisite: Ed. CI 320 or 322 or written consent of the Department of Elementary Education.

NOTE: Students required to present written consent of the Department must file same with their registration forms.

Ed. CI 580—W. H. Worth and Associates (10-0)

Curriculum Development—Curriculum research, theory and practice with particular reference to curriculum aims, content, organization, and change.

EDUCATION: Industrial Arts Education

Ed. IA 203 (10-0) (1st 3 weeks)

Introduction to Industrial Arts—An examination of past and present theory and practice in industrial arts education.

Ed. IA 260 (10-20)

General Industrial Arts—Development of basic knowledge and skill in the following: ceramics, electricity, graphic arts, metals, plastics, wood; organization and management of multiple-activity laboratories.

NOTE: This course is designed to prepare industrial arts majors for teaching in grades seven and eight.

Ed. IA 344 (20L)

Electricity—Principles of alternating currents; single-phase induction motors; rectifiers; telephones; electronics; electro-magnetic waves; transformers. Prerequisite: Ed. IA 244.

EDUCATION: Vocational Education

Ed. Voc. 280 or 480 (10-0)

Curriculum and Instruction in Vocational Education—General principles of teaching; specialized methods; trade and job analysis; course construction; instructional materials and their use; tests and evaluation; vocational guidance.

NOTE: Holders of degrees should register in Ed. Voc. 480; others, in Ed. Voc. 280.

Ed. Voc. 350 (10-0)

Educational Programs and Practices in Industry and Labor—Scope, organization, practice and evaluation of educational programs conducted by management and labor.

Ed. Voc. 589 (10-0) (1st 3 weeks)

Organization of Vocational Education.

NOTE: This course must be taken concurrently with Ed. Voc. 591.

Ed. Voc. 591 (10-0) (2nd 3 weeks)

Problems and Trends in Vocational Education.

NOTE: This course must be taken concurrently with Ed. Voc. 589.

EDUCATION: Educational Foundations

Ed. Fdn. 414—W. E. Smith (10-0)

Sociology of the School—Study of the school as a social institution in the changing society.

***Ed. Fdn. 492**—G. Eastwood, M. R. Lupul and B. E. Walker (10-0)

Philosophy of Education—Philosophical bases of education, with particular reference to values, aims, curriculum, and the educative process.
Prerequisite: Philosophy 240 or 246.

Ed. Fdn. 494—K. H. Thompson (10-0)

History of Education—History of education from the Greeks to modern times, placing emphasis on great figures and major trends. The history of modern education in Canada, Britain, America, France, Germany, Denmark and Russia. Great issues in education: The influence of political, economic, social and religious institutions on education; theories of the role of education in the modern state; philosophy and education; psychology and education.

EDUCATION: Educational Psychology

Ed. Psy. 276—R. L. Hertzog (10-0)

Introduction to Educational Psychology—An introduction to childhood and adolescence, stressing physical, mental, social, emotional, and personality development; the psychology of learning and of the special learning areas; the application of psychological principles to classroom practice.

Ed. Psy. 308—W. D. Dannenmaier (10-0)

Guidance—Basic principles and techniques of guidance; case studies, interviews, records, with emphasis on scholastic and personal guidance; introduction to the tests and measures most commonly used in guidance.
Prerequisite: Ed. Psy. 276 or equivalent.

Ed. Psy. 310—J. J. Wine (10-0)

Personal Adjustment in Education—Dynamics of behavior, emotional and social adjustment of school children; teacher adjustment; social adjustment in the classroom.
Prerequisite: Ed. Psy. 276 or equivalent.

Ed. Psy. 354—R. Prouty (10-0)

Psychology and Education of Exceptional Children—A survey of the psychology and education of atypical children for whom special education is provided. Educational needs including curricula, teaching methods and classroom organization will be considered.

Prerequisite: Ed. Psy. 276 and two years of successful teaching.

Ed. Psy. 454—C. W. Woolcock (10-0)

Psychology and Education of Gifted Children—The psychological characteristics of children of superior academic ability; educational provision for superior children including identification, curriculum, teaching methods and classroom organization.

Prerequisite or corequisite: Ed. Psy. 354.

***Ed. Psy. 476**—G. M. Dunlop, J. Macdonald and A. J. Cropley (10-0)

Educational Psychology—Individual differences; psychology of learning and forgetting; motivation; personality, adjustment, and mental hygiene; introduction to evaluation and the testing program.

Prerequisite: Ed. Psy. 276 or Psychology 202 or equivalent.

Ed. Psy. 478—V. R. Nyberg (10-0)

Measurement and Evaluation—Measurement of classroom achievement; teacher-made and standardized tests; interpretation and use of test results; evaluation of non-academic achievements; recording and reporting pupils progress.

Prerequisite: Ed. Psy. 276 or equivalent.

Ed. Psy. 502—J. E. Bicknell (10-5)

Introduction to Educational Research—An introduction to quantitative and non-quantitative research; the applications of elementary statistics to the collection and analysis of data.

Ed. Psy. 570 (10-0)

Child Psychology—A systematic study of the growth, development, behavior and problems of adjustment of children of pre-school and elementary school ages.

Prerequisite: Ed. Psy. 476.

Ed. Psy. 576—R. S. MacArthur (10-5)

Statistics and Research Design in Education—Application of descriptive statistics and statistical inference, at an intermediate level, to problems of research design and measurement in education.

Prerequisite: Statistics 255 or Ed. Psy. 502.

ENGLISH

***English 200**—M. R. Legris, D. C. Bulter and D. A. Campbell (10-0)

English Literature From Chaucer to the Late Eighteenth Century—A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

NOTES:

1. Four essays will be required. The subjects will appear in the Pre-Session Study Syllabus, which will be sent to each student upon registration. The first essay must be submitted by April 1, the second by May 1, the third by June 1, and the fourth by June 15.
2. **Owing to the fact that preliminary essays are required, registration in this course will not be accepted after February 15 except from students who are repeating it from the immediately preceding winter session. Those students will do the essays during the Summer Session.**

English 288—N. Parker-Jervis (10-0)

An Introduction to the English Language—An historical and structural study of the sounds, grammar, and vocabulary of English.

***English 324**—Jean MacIntyre (10-0)

Nondramatic Literature of the English Renaissance—Castiglione, *The Courtier;* Erasmus, *The Praise of Folly;* More *Utopia;* Sidney, *Apologie for Poetrie; Elizabethan Fiction.* Selections from Skelton; *Silver Poets of the XVI Century;* selections from Spenser; Marlow, *Hero and Leander;* Shakespeare, *Sonnets;* Donne, *Complete Poetry and Selected Prose.*
Prerequisite: English 200 or equivalent.

***English 332**—G. S. McCaughey and J. F. Forrest (10-0)

Shakespeare—At study of Shakespeare's development as a dramatist. Eighteen plays will be discussed, not all in great detail. Among them will be the following:—*Love's Labour's Lost, Richard III, Romeo and Juliet, Richard II, Henry IV,* Part I, *Henry IV,* Part II, *Henry V, Hamlet, Othello, King Lear, Macbeth, Antony and Cleopatra, The Tempest.*
Prerequisite: English 200 or equivalent.

***English 388**—F. Bessai (10-0)

The History of the English Language—A detailed analysis of the historical development of the English language, together with some study of its cultural and stylistic evolution, as reflected in the prose tradition from the Old English period to the present day. Some knowledge of French and Latin (or German) is recommended.
Prerequisite: English 200 or equivalent.

***English 389**—G. Cannon (10-0)

Modern English Grammar—A survey of several approaches to the description of modern English grammar.
Prerequisite: English 200 or equivalent.

NOTE: With the approval of the Department of Secondary Education, this course may be accepted on the major in English in the Faculty of Education.

***English 395**—Diane Bessai (10-0)

English Literature From the Late Eighteenth Century On—A close study of representative masterpieces.
Prerequisite: English 200 or equivalent.

English 398—L. Logie (10-0)

Children's Literature—A historical and critical study of literature written for children with attention to the interaction between children's literature and educational theory. The course will bring to the attention of prospective elementary teachers some of the world's resources in good books for children.
Prerequisite: English 200 or equivalent.

NOTES:

1. This course is restricted to B.Ed. students in the Elementary Route.
2. This course may not be presented for degree credit in the Faculties of Arts and Science.

FRENCH

French 201—M. Kalinowski (10-10)

First Year University French (Education)—An intensive course in modern French, with emphasis on the spoken language, open only to students registered in the Faculty of Education. French-speaking students will be given a placement test to determine whether they may be admitted to this or another course. The sequent course is French 330.
Prerequisite: Grade XII French or French 100.

NOTE: This course may not be presented for degree credit in the Faculties of Arts and Science.

***French 330**—R. G. Motut (10-0)

French Language and Civilization—Pronunciation: sounds of the French language; the International Phonetic Alphabet; drill in basic speech patterns.

Grammar: a general review with emphasis on those constructions in which French usage differs from English; translation from French to English and from English to French.

Civilization: aspects of contemporary French life and letters; specimens of post-war prose and verse.
Prerequisite: French 200 or 201.

***French 350**—J. A. Dainard (10-0)

Second Year French Authors and Grammar—The study of representative literary works from the Middle Ages to the present day; oral and composition work based on the texts studied. The principal authors are Villon, Ronsard, Molière, Voltaire, Baudelaire, Maupassant and Camus. An intermediate course.
Prerequisite: French 200.

***French 400**—A. Connell (10-0)

Seventeenth Century—This course consists of a study of the literature and society of the seventeenth century in France. The classical theatre: Corneille, Molière, Racine; the novel; Descartes, Pascal; La Rochefoucauld and La Bruyère; La Fontaine.
Prerequisite: One senior French course.

GEOGRAPHY

***Geography 201**—C. R. Schroeder (10-8)

Physical Geography—A systematic study of the origin, nature, and distribution of elements of the natural environment. Land forms, weather and

climate, vegetation, soils, water, and mineral resources will be related to each other in place. The laboratory work will complement the lectures and will include interpretation, study, and preparation of maps and charts.

NOTES:

1. Geography 201 is classified as a science course.
2. For laboratory work students will meet in sections scheduled for different hours (see timetable). When registering they should indicate their choice of section.

***Geography 300**—D. W. Harvey (10-0)

Human Geography—The significance of human distribution on the earth. Man's relation to the physical environment; world population problems; cultural patterns in the world; aspects of political and economic geography in selected world trouble areas; racial geography and urban geography. Students planning on taking this course are strongly urged to precede it by Geography 201.

NOTE: Geography 300 is classified as a social science course.

***Geography 420**—J. D. Wood (10-0)

Political Geography—A study of the state areas as a geographical phenomenon and as a causal factor in the nature and distribution of other features of geographical significance.
Prerequisite: A course in geography, or written consent of the Department.

NOTE: Written consent of Department where required must be filed with registration form.

GERMAN

***German 200**—A. Malycky (10-5)

First Year University German—This course is devoted to the development of the student's ability in speaking, reading and writting German, using modern short stories, cutlural readers and audio-visual aids.
Prerequisite: German 30, German 100 or the equivalent.

NOTE: German speaking students wishing to take this course must obtain approval in advance from the Division of Germanic Languages. Failure to do so may result in exclusion from the course at a later date.

HISTORY

***History 201**—J. W. Larner (10-0)

European History—European civilization since the Renaissance.

***History 308** (10-0)

European History Since 1815.

***History 352** (10-0)

The British Empire and Commonwealth—A survey of the history of the British Empire and the Commonwealth.

***History 360** (10-0)

The United States, 1492-1941.

***History 370**—D. L. Smith (10-0)

Canada—A survey of the political and social history of Canada.
Prerequisite: A previous course in history or the written consent of the Department of History.

NOTE: Consent of the Department where required must be filed with registration form.

HOUSEHOLD ECONOMICS

***H.Ec. 210**—Corinne Greschuk (10-15)

Food and Nutrition—An elementary study of the composition and nutritive value of foods, with laboratory practice in food preparation, meal planning and service.

NOTE: Not more than one of Household Economics 210 or 350 may be taken for credit in the Faculties of Arts and Science.

H.Ec. 303—Helen Breslin (10-15) (1st 3 weeks)

Household Management—Materials found in the home; principles involved in their care; the house, its equipment and furnishings: labor-saving devices; management.

H.Ec. 453—Helen Breslin (10-0) (2nd 3 weeks)

Family Finance—Standards of living; family income, savings and expenditures; consumer economics and consumer education.

H.Ec. 462—Helen Moseson (10-15)

Advanced Clothing—The study of historic and contemporary costume design. The development of the foundation pattern. Flat pattern designing for selected garments and construction in appropriate fabrics.
Prerequisite: H.Ec. 202.

LINGUISTICS

***Linguistics 400**—W. F. Klatte (10-0)

General Linguistics—An introduction to and a survey of the field of language and languages dealing with the fundamentals of structural and historical linguistics. Topics discussed include language families, types of languages, linguistic change, linguistic structure. Emphasis will be placed on modern European languages.

***Linguistics 420** (10-0)

Phonemics, Morphemics and Syntax—Phonemic theory and analysis; the relation of phonetics to phonemics. Theory and methods of grammatical analysis, stressing the identification and analysis of the morphological and syntactic units of a language. Examples will be taken from several Indo-European languages as well as Eskimo and American Indian languages.
Prerequisite or corequisite: Linguistics 410 or 410(a).

NOTE: Not open to student with credit in Linguistics 410(b).

***Linguistics 430**—Jo Ann Davis (10-0)

Contrastive Linguistics—An analytical study of the French and English

languages, comparing and contrasting their linguistic structure, i.e., phonetics, phonemics, morphology, syntactical patterns and lexicology. Practical work in oral recognition and phonetic transcription.

NOTE: With the approval of the Department of Secondary Education, this course may be accepted in lieu of item 4 or 5 on the major in French in the Faculty of Education.

***Linguistics 460**—G. N. O'Grady (10-0)

Field Methods in Linguistics—Recording techniques and methods of analysis illustrated by the study of an American Indian language or Eskimo. Problems in translating. Native informants and recorded material will be available.
Prerequisite or Corequisite: Linguistics 410(a) or 410(b) or Linguistics 410 or Linguistics 420.

NOTE: Students who cannot present any of the above either as prerequisites or corequisites must obtain the written consent of the Associate Director of the Summer School of Linguistics to register in this course and must attach same to their registration forms.

***Linguistics 470**—H. Hoijer (10-0)

American Indian Linguistics—A survey of indigenous languages of North America, with special reference to those spoken in western Canada. A study of the distribution and structural characteristics of these languages, supplemented by laboratory work involving analysis of an American Indian language, using a native speaker as an informant.
Prerequisite: Linguistics 400 or equivalent.

MATHEMATICS

***Mathematics 201**—R. A. MacLeod (10-8)

Introductory Calculus—Rates of change. Differentiation and integration of simple functions. Applications. Analytic geometry of the conic sections. Exponential, logarithmic and trigonometric functions.
Prerequisite: Mathematics 30 and 31 or their equivalent.

NOTE: Mathematics 201 may not be taken concurrently with another course.

Mathematics 264—L. Mysak (10-0)

Foundations of Mathematics—Axiomatics. Sets and relations. Elementary logic. Classical and modern views of geometry. The number system. Systems of numeration and scales of notation. Measurement.
Prerequisite: Mathematics 30.

NOTES:

1. This course is restricted to students in the Faculty of Education. It should be of special interest to all teachers who may find themselves called upon to teach the new mathematics program being introduced into elementary and secondary schools.
2. This course cannot be applied on a major in mathematics.
3. Credit may not be obtained in both Mathematics 264 and Mathematics 274.

***Mathematics 274**—D. R. Crosby (10-0)

Algebra and Geometry—Logic and sets. Axiomatic geometry. Projective geometry. Rotation of axes. Graphs of polynomial functions. Linear equations.

Vectors, matrices and determinants. Mathematical systems (scales of notation). Mathematical induction. Binomial theorem. The axiomatic approach to the number system. General algebraic systems.
Prerequisite: Mathematics 30.

***Mathematics 330**—T. Fostvedt (10-0)

Elementary Mathematics From An Advanced Viewpoint—Topics from oridinary high school algebra and geometry will be treated from the unifying point of view of more modern concepts such as functions, set, group, symbolic logic, the axiomatic method, and the development of a number system.

NOTE: This course is designed primarily for teachers of high school mathematics.

***Mathematics 360**—E. L. Whitney (10-0)

Geometry—Various elementary concepts of space, such as euclidean, affine, projective, non-euclidean, and topological spaces; axiomatic treatment and models; relation to group theory.
Prerequisite: Mathematics 40 or 304, or 306.

MUSIC

Music 210—Elizabeth Filipkowski (10-10)

Foundations of Music—The development of a musical repertory and a knowledge of basic content appropriate for teachers.

NOTE: This course is open only to B.Ed. students lacking the prerequisite for Music 200 and cannot be used to replace Music 200 as the prerequisite for advanced courses in Music.

***Music 400**—R. A. Stangeland and F. Dunnigan (10-15)

History of Music and Instrumental Technique—Styles and techniques of composers from Debussy to the present.
The laboratory includes the study of stringed instruments as applied to orchestral groups.
Prerequisite: Music 300 or equivalent.

PHILOSOPHY

***Philosophy 240**—R. Bosley, J. D. Dutton, H. Lehman and R. Mouw (10-0)

Introduction to Western Philosophy—This course is designed to introduce the student to the main problems and theories that have dominated philosophical though in the Western world, through the study of discussion of selected philosophical classics. Emphasis will be placed both upon a sound acquaintance with the main outlines of our philosophical tradition and upon the ability to handle philosophical ideas independently. To this end both lectures and discussions will form part of the student's training.

***Philosophy 242** (10-0)

Foundation and Development of Christian Philosophy—A study of the ideas and main currents of Western Philosophy from its beginnings in the creative period of Greek thought, to achieve an appreciation of the historical roots of

our civilization. Selected ideas and problems will be examined in the writings of significant contributors to this development. Lectures and discussions. (This course is offered by St. Joseph's College and is accepted as an alternative to Philosophy 240.)

***Philosophy 260**—H. Tennessen (10-0)

Introduction to Logic, Semantics and Scientific Method—This course introduces the student to the theory and practice of interpretation and definition, precise argumentation, objective judgment and relational decision making, with a brief elementary introduction to symbolic logic.
Its general purpose is to show how to distinguish between sound and unsound beliefs and thus to serve as an introduction to philosophic method.

***Philosophy 346** (10-0

Medieval Philosophy—An introduction to the philosophy of the Middle Ages. Stress will be laid on the reading of texts, especially those of St. Augustine, St. Bonaventure, St. Thomas Aquinas, Duns Scotus and William of Ockham. Arabian and Jewish philosophy will also be considered as essential to the total picture of philosophical thought.
Prerequisite: Philosophy 240 or 242.

***Philosophy 350**—E. W. Kemp (10-0)

Aesthetics—An inquiry into the nature and justification of standards of art and beauty.

PHYSICAL EDUCATION

Physical Education 200—Margaret Caudwell (20L)

Introduction to Elementary School Physical Education—A study of children at play. Movement education leading to the development of skill in various fields of physical activity.

Physical Education 436—M. F. R. Smith and Audrey Carson

Activity Course—Comprises the following physical education courses:

P.E. 215—Aquatics (0-5)

P.E. 311—Tumbling and apparatus (0-5)

P.E. 403—Badminton, curling, skiing (0-5)

P.E. 405 (Women)—Modern dance (0-5)

P.E. 409 (Men)—Hockey and wrestling (0-5)

Prerequisite: For P.E. 311—P.E. 211.

NOTES:

1. Students must register specifically for each of the constituent courses they wish to take in a given Summer Session.
2. It is not necessary to register for all of the constituent courses in the same Summer Session.
3. For purposes of calculating class loads and tuition fees each of the constituent courses will be regarded as a quarter course.
4. This course probably will not be offered again in Summer Session.

Physical Education 544—M. L. Van Vliet and W. D. Smith (10-0)

Current Problems in Physical Education and Recreation—A review of the development of specialized areas in physical education and recreation. A case method study of organizational and administrative practices in various aspects of recreation and physical education.

PHYSICAL SCIENCE

***Physical Science 341** (10-0)

A course designed for B.A. and B.Ed. students to give them some appreciation of fundamental ideas and methods in the physical sciences, of modern trends in this field, and of its relation to other disciplines. Illustrative material will be taken from Physics, Chemistry, Astronomy and Geology, and the history and development of the subject will be stressed.

NOTES:

1. This course may not be used for credit towards the B.Sc. degree.
2. This course is not open to first year students, and may not be taken for credit by students who have credit in Physics 100 or 200.

PHYSICS

***Physics 240** (10-12)

Physical Properties of Matter, Heat and Sound—Mechanics, properties of matter, heat, light, wave-motion and sound. Illustrated by experiments.
Prerequisites: Physics 30, Mathematics 30 and Mathematics 201 or 207.

NOTE: Physics 240 may not be taken concurrently with another course.

***Physics 402** (10-0)

Introduction to Modern Physics—A study of modern physics, emphasizing the development of current theoretical concepts. Topics will include: kinetic theory of matter; electrons and electron tubes; fundamental particles; radiation and quantum theory; radioactivity and nuclear reactions; relativity.
Prerequisite: Physics 200, or 240 and 340; and Mathematics 201 or equivalent.

POLITICAL SCIENCE

***Political Science 200**—P. B. Bociurkiw (10-0)

Elements of Political Science—A study of the principles and practices of modern government, with emphasis on the democratic constitutional state. Among the topics studied are the nature and theory of the state; types of constitutions; the functions and composition of the legislature, executive and judiciary; representation; political parties and pressure groups.

***Political Science 320**—F. G. Hulmes (10-0)

Government of Canada—A study of the structure and functioning of the government of Canada, especially of the Commons, the Senate, the Cabinet System, the Civil Service; and the role of political parties.

PSYCHOLOGY

***Psychology 202**—W. A. S. Smith (10-0)

Introduction to General Psychology—A survey of problems, methods and principles in various fields of psychology.

***Psychology 341**—W. Wilson (10-0) (1st 3 weeks)

Social Psychology—An introduction to the study of individual and group behaviour observed in social processes.
Prerequisite: Psychology 202 or Sociology 202, or equivalent.
NOTE: Psychology 341 and Sociology 341 may not both be taken for credit.

***Psychology 365**—A. B. Carran (10-10) (1st 3 weeks)

Experimental Psychology: Learning—A basic course covering acquisition, retention and utilization of learned behavior. Laboratory will illustrate methods of studying learning in animals and humans.
Prerequisites: Psychology 202 or equivalent, and Statistics 205 or 255.

***Psychology 383**—E. Howarth (10-0) (2nd 3 weeks)

Personality—An introductory survey of the area of personality including a study of representative theoretical points of view and research relevant to the major problems in this area.
Prerequisite: Psychology 202 or equivalent.

***Psychology 489**—W. Wilson (10-0) (2nd 3 weeks)

Abnormal Psychology—A general introduction to abnormal psychology.
Prerequisite: Psychology 202 or equivalent and written consent of the Department of Psychology.
NOTE: Consent of department must be filed with registration form.

RUSSIAN

***Russian 360**—O. Starchuk (10-0)

Survey of the History of the Eastern Slavonic and Russian Literatures—Oral literature, the first writings, literature from the epic *Tale of Igor's Expedition* of the Twelth Century up to and including Classicism, Romanticism, Realism and the influence of the Naturalistic School. Social and political background. Advanced Russian grammer, conversation and composition.
Reading of the texts of the Nineteenth Century, with composition based on short stories by Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Chekhov and L. N. Tolstoy.
Prerequisite: One senior Russian course.

SOCIOLOGY

***Sociology 202**—C. Hynam, R. Watson, and D. Fish

Introductory Sociology—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes; analysis of society in terms of its structure, culture, and social ranking schemes; examination of the interrelationships between the various institutions (e.g. family, church, school, government), the processes whereby the individual becomes a human social animal and a member of society, and the sources of conformist and non-conformist behavior.

***Sociology 325**—G. Nettler (10-0) (1st 3 weeks)

Criminology—A critical examination of the meaning and attempted explanation of crime and juvenile delinquency, with an analysis of the social processes leading to criminal behavior.

***Sociology 327**—G. Nettler (10-0) (2nd 3 weeks)

Penology and Corrections—The evolution and evaluation of theories of punishment, the law and the courts, penal and reformatory institutions, probation and parole, a consideration of the various experiments in reform and rehabilitation.
Prerequisite: Sociology 325.

***Sociology 360**—C. L. French (10-0)

Social Class in Modern Society—An analysis of social stratification in western society, with reference ot the effects of industrialization, and including comparative analysis of primitive societies. Special attention given to the basis of stratification, the structure and function of social class systems, social mobility, and the special classes in modern society, such as the "managerial class" "labor", and "power elite", etc.

***Sociology 370**—A. Davis (10-0)

The Family—Structure and function of the family, comparative family systems, sociology of family life stages (such as childhood, adolescence, adulthood, old age), contemporary trends and problems of the family.

UKRAINIAN

***Ukrainian 300**—Y. Slavutych (10-0)

Second Year Ukrainian—Advanced Ukrainian grammar, composition, and oral practice based on selected texts of Ukrainian classical and contemporary literature.
Prerequisite: Ukrainian 100 or consent of the department.

ZOOLOGY

***Zoology 220** (10-12)

Elementary Zoology—Animal organization; comparative morphology; essentials of histology; principal phenomena of distribution, behaviour, ecology, reproduction and development; evolution, variation and heredity.

***Zoology 350** (10-12)

The Invertebrates—A survey of the inverebrates with emphasis on functional anatomy.
Prerequisite: Zoology 220.

SUMMER SESSION, 1964—EDMONTON

TIMETABLE

Schedule of Lecture Periods

8:00 a.m. to 10:00 a.m.

Anthropology 202
Anthropology 350
Drama 400
Economics 200
Ed. Adm. 559 and 561
*Ed. Bus. 246
Ed. Bus. 346 (8:00-12:15)
Ed. Bus. 350 (8:00-12:15)
Ed. CI 320
Ed. CI 342
Ed. CI 522
Ed. Fdn. 594
†Ed. IA 203—1st 3 wks.
Ed. Psy. 276
Ed. Psy. 308
Ed. Psy. 454
Ed. Psy. 476
*Ed. Psy. 502
Ed. Voc. 589—1st 3 wks.
Ed. Voc. 591—2nd 3 wks.
English 324
English 389
French 400
*Geography 201
History 352
History 360
*H.Ec. 210
*H.Ec. 303—1st 3 wks.
H.Ec. 453—2nd 3 wks.
*H.Ec. 462
Linguistics 400
Linguistics 420
*Mathematics 201
Mathematics 360
Philosophy 350
Phys. Ed. 311 (9:05-10:00)
Phys. Ed. 403 (8:00-8:55)
*Physics 240
Political Science 320
Sociology 202
Sociology 360
Ukrainian 300
*Zoology 350

10:15 a.m. to 12:15 p.m.

*Accounting 200
Anthropology 305
Art 400
*Chemistry 230
Economics 330
Ed. Adm. 525 and 563
Ed. Bus. 345
Ed. CI 254
Ed. CI 266
Ed. CI 278
Ed. CI 286
Ed. CI 292
Ed. CI 294
Ed. CI 298
Ed. CI 328
Ed. CI 338
Ed. CI 468
Ed. CI 580
Ed. Fdn. 414
†*Ed. IA 260
Ed. Psy. 478
Ed. Psy. 354
Ed. Voc. 280
Ed. Voc. 480
English 200
English 388
English 398
*French 201
French 330
Geography 420
History 201
History 308
Linguistics 460
Mathematics 264
Mathematics 274
Philosophy 240
Philosophy 242
Philosophy 346
Phys. Ed. 215 (10:15-11.10)
Phys. Ed. 405 (11:20-12:15)
Phys. Ed. 409 (11:20-12:15)
Phys. Ed. 544
Physics 402
*Psychology 365—2nd 3 wks.
Psychology 383—1st 3 wks.
Sociology 325—1st 3 wks.
Sociology 327—2nd 3 wks.
*Zoology 220

1:30 p.m. to 3:30 p.m.

Art 230 (1:30-5:30)
Art 240 (1:30-5:30)
Business Law 310
Classics 352
Drama 360
Economics 320
Ed. Adm. 461
Ed. CI 221—2nd 3 wks.
Ed. CI 237—1st 3 wks.
Ed. CI 332
Ed. CI 346
Ed. CI 362
Ed. CI 438
Ed. Fdn. 492
†Ed. IA 344 (1:30-5:30)
Ed. Psy. 310
Ed. Psy. 570
*Ed. Psy. 576
Ed. Voc. 350
English 288
English 332
English 395
French 350
Geography 300
*German 200
History 370
Linguistics 430
Linguistics 470
Mathematics 330
*Music 210
*Music 400
Philosophy 260
*Phys. Ed. 200
Physical Science 341
Political Science 200
Psychology 202
Psychology 341—1st 3 wks.
Psychology 489—2nd 3 wks.
Russian 360
Sociology 370

*Consult also the Schedule of Laboratory Periods on the next page.

†These courses will be offered at Hillcrest School, Jasper Place, or at the Northern Alberta Institute of Technology.

Schedule of Laboratory Periods

Accounting 200—1:30-3:30 p.m., MTWTh.
Chemistry 230—1:30-4:30 p.m., MTWTh.
Ed. Bus. 246—1:30-3:30 p.m., daily.
†Ed. IA 260—1:30-5:30 p.m., daily.
Ed. Psy. 502—10:15-11:15 a.m. daily.
Ed. Psy. 576—3:45-4:45 p.m., daily.
French 201—1:30-3:30 p.m., daily.
Geography 201: Sect. 1—1:30-3:30 p.m., MTWTh.
Sect. 2—3:45-5:45 p.m., MTWTh.
German 200—3:45-4:45 p.m., daily.
Household Economics 210—1:30-4:30 p.m., daily.
Household Economics 303—1:30-4:30 p.m., daily (1st 3 weeks).
Household Economics 462—1:30-4:30 p.m., daily.
Mathematics 201—1:30-3:30 p.m., MTWTh.
Music 210: Choral and Instrumental—3:30-4:30 p.m., daily.
Listening—5 hours per week, to be arranged.
Music 400: Instrumental—10:15 a.m.-12:15 p.m., daily.
Listening—5 hours per week, to be arranged.
Physical Education 200—10:15 a.m.-12:15 p.m., daily.
Physics 240—1:30-4:30 p.m., MTWTh.
Psychology 365—1:30-4:30 p.m., MTWTh (2nd 3 weeks).
Zoology 220—1:30-4:30 p.m., MTWTh.
Zoology 350—1:30-4:30 p.m., MTWTh.

†Scheduled for Hillcrest School, Jasper Place, or the Northern Alberta Institute of Technology.

SUMMER SESSION, 1964—CALGARY

TIMETABLE

Schedule of Lecture Periods

8:00-10:00 a.m.	10:15 a.m.-12:15 p.m.	1:30-3:30 p.m.
*Accounting 200	Classics 385	Art 230 (1:30-5:30)
Art 200	Economics 200	Business 300
*Botany 370	Ed. Adm. 562	Ed. Adm. 564
*Chemistry 250	Ed. CI 254	Ed. CI 320
Ed. Adm. 461	Ed. CI 270	Ed. CI 324
Ed. CI 205	Ed. CI 274	Ed. CI 332
Ed. CI 580	Ed. CI 306	Ed. CI 342
Ed. Fdn. 201 (1st 3 weeks)	Ed. CI 328	Ed. Fdn. 492
Ed. IA 241-341 (8-12)	Ed. CI 336	Ed. IA 248 (1:30-5:30)
Ed. IA 345 (8-12)	Ed. Fdn. 414	Ed. Psy. 310
Ed. IA 349 (8-12)	Ed. Fdn. 514	*Ed. Psy. 502
*Ed. Psy. 452	Ed. Psy. 276	English 386
Ed. Psy. 476	Ed. Psy. 478	*French 200
English 332	English 240	History 205
French 350	English 397	History 309
Geography 300	*Geography 210	History 391
History 363	History 353	Mathematics 281
*Mathematics 211	Physical Education 392	*Music 311
*Music 210	Sociology 340	Physical Education 200
*Philosophy 241	Sociology 390	Physical Education 401-407
Physical Education 211-307		Psychology 488
*Physics 200		
Political Science 200		
Sociology 202		
*Statistics 265		
*Zoology 308		

*See also Schedule below.

Schedule of Laboratory Periods and Tutorials

Accounting 200—10:15 a.m.-12:15 p.m., MTWTh.
Botany 370—1:30-4:30 p.m., MTWTh.
Chemistry 250—1:30-4:30 p.m., MTWTh.
Ed. Psy. 452—10:15 a.m.-12:15 p.m., daily.
Ed. Psy. 502—3:45-4:45 p.m., daily.
French 200—3:45-4:45 p.m., daily.
Geography 210—Tutorial: 3:30-5:30 p.m., MW. Also 1 hour to be arranged.
Mathematics 211—1:30-4:30 p.m., MTWTh.
Music 210—10:15 a.m.-12:15 p.m., MTWTh.
Music 311—3:45-5:45 p.m., daily.
Philosophy 241—Tutorials to be arranged.
Physics 200—1:30-4:30 p.m., MTWTh.
Statistics 265—1:30-4:30 p.m., MTWTh.
Zoology 308—1:30-5:30 p.m., daily.

TEXTBOOK ORDER FORM
Summer Session, 1964

From .....

Address .....

.....

To: University Bookstore, Edmonton, Alberta.

Please forward the following books, C.O.D.

Course	Textbook(s)

Do not send payment with orders.

Announcement

of the

Evening Credit Program

1964-65

University of Alberta, Edmonton

Important Information

COMMUNICATIONS

Mail should be addressed to the appropriate officer at the University of Alberta, Edmonton, Alberta.

Dr. W. H. Johns, *President*

Dr. J. W. Gilles, *Director, Evening Credit Program*

Dr. D. E. Smith, *Dean, Faculty of Arts*

Dr. M. Wyman, *Dean, Faculty of Science*

Dr. H. T. Coutts, *Dean, Faculty of Education*

Dr. A. G. McCalla, *Dean, Faculty of Graduate Studies*

Dr. H. W. Harries, *Dean, Faculty of Commerce*

Miss Ruth McClure, *Director, School of Nursing*

Mr. A. D. Cairns, *Registrar*
Admissions, Registration, Examinations, Records, Transcripts, Convocation.

Mr. A. J. B. Hough, *Director, Student Counselling*
Change of Faculty, Interest and Aptitude Tests, Personal Problems, Unsatisfactory Standing, Vocational Planning, Withdrawals from University.

Mr. J. M. Whidden, *Bursar*
Payment of Fees

OFFICE HOURS

Monday through Friday
8:30 a.m. to 12:00 noon and 1:00 p.m. to 4:30 p.m., all year.

Saturday
Reduced service 8:30 a.m. to 12:00 noon, mid-September to mid-May. Closed the remaining four months.

TABLE OF CONTENTS

	Page
Important Information	3
Academic Schedule	5
Academic Staff	7
GENERAL INFORMATION	
Centres, Courses and Timetables	9
Classification of Students	11
Matriculation Requirements	11
Admission Procedures	13
Registration Procedures	14
Fees	15
Textbooks	15
Attendance	16
Examinations	16
FACULTY OF ARTS	19
FACULTY OF SCIENCE	20
FACULTY OF EDUCATION	
Standard Elementary B.Ed. Program	21
Standard Secondary B.Ed. Program	22
FACULTY OF COMMERCE	23
DETAILS OF COURSES	24
Textbook Order Form	31

ACADEMIC SCHEDULE

Evening Credit Program, 1964-65

1964

August—

Tuesday, 4—

Last day for receiving Applications for Admission to the University from prospective undergraduate students.

Last day for students to file Application for Transfer of Record from Calgary to Edmonton Campus. (For details see reverse side of registration form.)

Tuesday, 11—

Last day for receiving applications for September supplementals.

Monday, 31—

Last day for receiving registrations in the Evening Credit Program (including those of students in the Faculty of Graduate Studies).

September—

Tuesday, 1—

Supplemental examinations begin.

Saturday, 26—

Special supplemental examinations.

Monday, 28—

Evening Credit Program classes begin at Edmonton, Vegreville and Westlock.

Tuesday, 29—

Classes begin at Evansburg.

Wednesday, 30—

Classes begin at Camrose, Radway and Red Deer.

October—

Thursday, 1—

Classes begin at Holden and Wetaskiwin.

Saturday, 3—

Classes begin at Grande Prairie.

Monday, 12—

Thanksgiving Day. Classes will not meet.

Thursday, 15—

Last day for payment of undergraduate fees without penalty.

November—

Saturday, 7—

Fall Convocation (to be held at Edmonton).

Monday, 9 to Saturday, 14—

Test Week. Evening Credit Program classes will meet as usual.

December—

Saturday, 19—

Last day of lectures before Christmas vacation.

1965

January—

Monday, 4—
First term lectures resume.

Monday, 11 to Saturday, 16—
Mid-session examinations. Evening Credit Program classes, except those in half-courses, will meet as usual.

Monday, 18—
Lectures in second term half-courses commence.

February—

Friday, 5—
Last day for application for graduate degrees and degrees in Arts, Science, Education, and Pharmacy to be conferred at Spring Convocation.

March—

Monday, 29—
Last day for receiving applications for supplemental examinations to be written in April.

April—

Thursday, 15—
Last day of lectures in the Evening Credit Program.

Tuesday, 20—
Final examinations begin.

Friday, 30—
Last day for registration of students in Summer Session.

May—

Wednesday, 12—
Notice of intention to be absent from Convocation must be given by 12:00 noon.

Friday, 28—
Convocation (Part I) for the conferring of degrees and diplomas.

ACADEMIC STAFF

ABRAHAMSSON, K. V., Fil.Mag., Fil.Lic., Assistant Professor of Geography, University of Alberta.

BAIRD, R., B.A., M.A., Ph.D., Assistant Professor of Political Science, University of Alberta.

BAUER, M. F., B.A., M.A., Assistant Professor of Economics, University of Alberta.

BOCIURKIW, B. R., B.A., M.A., Ph.D., Associate Professor of Political Science, University of Alberta.

CAMPBELL, D. A., B.Ed., Sessional Lecturer in English, University of Alberta.

CARRAN, A. B., B.S., Ph.D., Research Associate, Department of Psychology, University of Alberta.

DANNENMAIER, W. D., B.A., M.A., Ed.D., Associate Professor of Educational Psychology, University of Alberta.

EASTWOOD, G. R., B.Ed., B.A., M.A., Ph.D. Associate Professor of Educational Foundations, University of Alberta.

EICK, R. E., B.A., M.A., Assistant Professor of Educational Foundations, University of Alberta.

FILIPKOWSKI, Elizabeth, B.Ed., M.A., Assistant Professor of Elementary Education, University of Alberta.

FORREST, J. F., M.A., B.Litt., A. M., Ph.D., Associate Professor of English, University of Alberta.

FRAZER, Frances M., B.A., M.A., Assistant Professor of English, University of Alberta.

FRITZ, J. O., M.A., M.Sc., Ed.D., Associate Professor of Secondary Education, University of Alberta.

GILSDORF, Joy, B.A. M.A., Edmonton.

GLYDE, H. G., A.R.C.A., R.C.A., Professor and Head, Department of Fine Arts, University of Alberta.

GULUTSAN, M., B.A., B.Ed., Ph.D., Associate Professor of Educational Psychology, University of Alberta.

HAQUE, W., M.A., M.S., Ph.D., Associate Professor of Economics, University of Alberta.

HARPER, R. J. C., M.A., Ph.D., Associate Professor of Educational Psychology, University of Alberta.

HOBART, C. W., B.A., M.A., Ph.D., Associate Professor of Sociology, University of Alberta.

HYNAM, C. A. S., Dip. Agric. (I.C.T.A.), M.S., Ph.D., Assistant Professor of Sociology, University of Alberta.

KALINOWSKY, M., E.S.C.P., M.A., Lecturer in French, University of Alberta.

KEMP, E. W., B.Ed., M.A., Assistant Professor of Philosophy, University of Alberta.

LEGRIS, M. R., B.A., B.Ph., M.A., Lecturer in English, St. John's College, Edmonton.

LONGLEY, R. W., B.S.C., A.M., Ed.M., M.A., Associate Professor of Geography, University of Alberta.

LUNGSTRASS, H. W., Dipl.Volkswirt, DrRerPol., Assistant Professor of Sociology, University of Alberta.

LUPUL, M. R., B.A., B.Ed., M.A., Ph.D., Associate Professor of Educational Foundations, University of Alberta.

McCAUGHEY, G. S., C.D., B.A., M.A., Assistant Professor of English, University of Alberta.

MACDONALD, J., M.A., Ed.B., Ph.D., Associate Professor of Educational Psychology, University of Alberta.

MORAVCIK, I., B.A., M.A., Ph.D., Associate Professor of Economics, University of Alberta.

MORDECAI, Vivien, B.A., Sessional Lecturer in French, University of Alberta.

MURDESHWAR, M. G., M.A., Ph.D., Assistant Professor of Mathematics, University of Alberta.

NETTLER, Gwynn, A. B., M.A., Ph.D., Associate Professor of Sociology, University of Alberta.

PARKER, H. A., B.A., M.A., Assistant Professor of Sociology, University of Alberta.

PARKER-JERVIS, N., B.A., Instructor in English, University of Alberta.

PHIBBS, E., M.A., Associate Professor of Mathematics, University of Alberta.

POCKLINGTON, T.C., B.A., Ph.D., Assistant Professor of Political Science, University of Alberta.

THOMAS, G., B.F.A., Lecturer in Art, University of Alberta.

TRETIAK, Salomea, B.A., M.A., Assistant Professor of Nursing, University of Alberta.

WILLIAMSON, C. T., B.A., B.Phil., Assistant Professor of Philosophy, University of Alberta.

ZINGLE, H. W., B.Ed., M.Ed., Assistant Professor of Educational Psychology, University of Alberta.

GENERAL INFORMATION

Through its Evening Credit Program, the University of Alberta offers credit courses at various centres in the evening. The purpose of this program is to enable persons employed during the day either to commence or to continue their university studies. The courses provided are selected primarily to meet the needs of students working towards the following degrees: B.Ed., B.A., B.Com. (first two years only).

A student proceeding towards a first degree normally will be required to attend at least one academic year as a full-time student.

Students should register as early as possible. The deadline for registration is August 31.

The University reserves the right to restrict registration in, or to withdraw, any of the courses proposed for the 1964-65 Evening Credit Program.

CENTRES, COURSES AND TIMETABLES

EDMONTON

A—Arts Building
C—Chemistry Building
E—Education Building
M—Medical Building
MP—Mathematics-Physics Building
N—North Laboratory
V—Lecture Wing, MP and C

Monday and Thursday, 6:30-7:45 p.m. (except as noted)

Economics 200	W. Haque	A 148
Economics 390	I. Moravcik	N 240B
Educational Foundations 492	M. R. Lupul	E 129
Educational Psychology 476	J. Macdonald	E 122
English 200: Section 1	M. R. Legris	A 135
Section 2	N. Parker-Jervis	A 139
Section 3	D. A. Campbell	A 143
English 398	Frances Frazer	A 236
†French 200	Vivien Mordecai	A 19
*Geography 201	K. V. Abrahamsson	A 334
History 360	Joy Gilsdorf	A 142
Nursing Education 453	Salomea Tretiak	M2099
Philosophy 240	E. W. Kemp	A 111
Political Science 310	T. Pocklington	N 240A
Sociology 202	C. A. S. Hynam	V 114
Sociology 360	H. A. Parker	MP 145

†Laboratory: 1 hour per week additional to be arranged.
*Laboratory: Monday, 8-10 p.m.

Tuesday and Friday, 6:30-7:45 p.m. (except as noted)

Art 230 (6:30-9:00 p.m.)	G. Thomas	A 448
Art 240 (6:30-9:30 p.m.)	H. G. Glyde	A 426
Business Law 310		E 122
Education CI 314	Elizabeth Filipkowski	E 475

Education CI 362	J. O. Fritz	E 228
Educational Foundations 414	R. E. Eick	E 128
Educational Psychology 570	R. J. C. Harper	E 201
English 332	J. F. Forrest	A 143
French 330	M. Kalinowsky	A 19
Geography 303	R. W. Longley	A 334
Mathematics 274	M. G. Murdeshwar	MP 132
Mathematics 374	E. Phibbs	MP 138
Psychology 202	A. B. Carran	A 139
Sociology 341—1st term	G. Nettler	MP 145
Sociology 346—2nd term	G. Nettler	MP 145

CAMROSE

Sociology 380—C. W. Hobart
Wednesday, 6:30-9:30 p.m. Camrose Lutheran Junior College.

EVANSBURG

Sociology 202—H. Lungstrass
Tuesday, 6:30-9:30 p.m. High School.

GRANDE PRAIRIE

Educational Psychology 310—W. Dannenmaier
Saturday, 1:30-4:30 p.m. Montrose Junior High School.

HOLDEN

Political Science 391—D. A. Baird
Thursday, 6:30-9:30 p.m. High School.

RADWAY

Political Science 340—B. R. Bociurkiw
Wednesday, 6:30-9:30 p.m. High School.

RED DEER

Educational Foundations 492—G. R. Eastwood
Wednesday, 6:30-9:30 p.m. Vocational High School.
Educational Psychology 478—H. Zingle
Wednesday, 6:30-9:30 p.m. Lindsay Thurber Composite High School.
English 332—G. R. McCaughey
Wednesday, 6:30-9:30 p.m. Vocational High School.

VEGREVILLE

Philosophy 240—C. T. J. Williamson
Monday, 6:30-9:30 p.m. High School.

WESTLOCK

Educational Psychology 310—M. Gulutsan
Monday, 6:30-9:30 p.m. High School.

WETASKIWIN

Economics 200—M. F. Bauer
Thursday, 6:30-9:30 p.m. High School.

CLASSIFICATION OF STUDENTS

Students are classified as graduates, undergraduates, specials and auditors. **Graduate Students** are admitted to the Faculty of Graduate Studies in one of the following categories:

1. **Candidates for a master's degree.**
2. **Provisional candidate for a doctor's degree.** All Ph.D. and Ed.D. candidates are classified as provisional candidates until they have passed their Candidacy Examinations.
3. **Probationary graduate students.** One whose university record is either: (a) difficult to assess (e.g. some foreign students) or (b) below the standard normally required.
4. **Conditional graduate students.** One who is required to take undergraduate courses prerequisite to, and in addition to, the graduate program. Fees for such courses are not included in graduate program fees.
5. **Special graduate students.** One who wishes to take graduate courses for purposes other than degree credit at this university.

Undergraduate Students are those who possess full senior matriculation and who are taking one or more courses for credit towards an undergraduate degree.

Special Students are those who, although registered in one or more courses, are currently neither seeking credit towards a degree or diploma granted by this university, nor entrance into a graduate program.

Auditors are students who have been granted official permission to attend lectures in a course on the understanding that they may not participate in class discussions, assignments or examinations. The audit privilege is restricted to a student who is currently registered in a degree or diploma program, and who secures written permission from the instructor in the course, endorsed by the student's Dean or Director, to register in the course as an auditor.

MATRICULATION REQUIREMENTS

GENERAL REQUIREMENTS

Matriculants from the high schools of Alberta seeking admission to the University must possess—

(a) a high school graduation diploma with
(b) "B" (50%) or higher standing in the required courses of Grade XII as set forth in the prescriptions of the various faculties and schools, and
(c) an average in these courses of at least 60.0%.

Notes:

1. A student from another Province in Canada who has obtained clear senior matriculation for the University or Universities of that Province will be admitted to the University of Alberta with clear matriculation subject to the requirements for the first year courses in each program. Students who do not have clear matriculation on this basis will be required to complete full Alberta matriculation of the Faculty to which admission is sought.
2. **These general requirements nothwithstanding, the University may at its discretion refuse admission to any applicant. For example, this regulation normally will be applied in cases where applicants have written an**

inordinate number of examinations in order to attain the nominal entrance requirements of the University of Alberta.

FACULTY OF ARTS

For a B.A. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3. Mathematics 30;
4. A language other than English (see below);
5. Physics 30 or Chemistry 30 or Biology 30 (or 32 up to and including 1965);
6. A second language (item 4) or a second science (item 5).

Notes:

1. The matriculation language other than English normally will be one of the languages taught in Alberta High Schools, i.e. French 30, Latin 30, or German 30. However, the Faculty will accept Greek, Italian, Russian or Spanish at an equivalent level.
2. If a second matriculation language is presented, it may be any of the languages mentioned in the preceding paragraph, or any other language (at an equivalent level) provided it is not from the same linguistic group as the first matriculation language. Students wishing to present a language not mentioned above should submit to the Dean's office evidence of their attainment in that language.

FACULTY OF SCIENCE

For a B.Sc. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3. Mathematics 30;
4. **One** of: French 30, German 30, Latin 30;
5. and 6. **Two** of: Chemistry 30, Physics 30, Biology 30 (or 32 up to and including 1965.)

FACULTY OF COMMERCE

For a B.Com. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3. Mathematics 30;
4. 5, and 6. **Three** of Chemistry 30, Physics 30, Biology 30 or 32, French 30 or German 30 or Latin 30.

FACULTY OF EDUCATION

For a B.Ed. Program—The general requirements with credit in:

1. English 30;
2. Social Studies 30;
3. 4, 5, 6. **Four** of: French 30, German 30, Latin 30, Chemistry 30, Physics 30, Biology 30 or 32, Mathematics 30, Mathematics 31 (if credit obtained in June, 1962, or subsequently), Music 30.

Notes:

1. Candidates intending to major in biological sciences or household economics should present Chemistry 30 or equivalent.
2. Candidates intending to major in physical sciences should present Chemistry 30, Physics 30, and Mathematics 30 or equivalents.
3. Candidates intending to major in mathematics should present Mathematics 31 in addition to Mathematics 30.
4. Mathematics 31 will be accepted only on the basis of a Grade XII Departmental examination.
5. Adult applicants (age 20 or over) will not be required to present a high school diploma, but (b) and (c) of the General Requirements still apply.

OTHER FACULTIES

Students interested in the matriculation requirements of other faculties and schools of the University should address a request for the appropriate calendar to the Registrar.

ADMISSION PROCEDURES

Application Forms

Prospective students who have not previously attended the University of Alberta must secure and complete Application for Admission forms and must submit them to the appropriate office **by the prescribed deadline**. Applicants for admission to the Faculty of Graduate Studies must obtain forms from the Dean of that Faculty. Applicants for admission to undergraduate programs or as special students may obtain them from the Registrar of the University at Edmonton.

Deadlines

Applications for admission to undergraduate programs ..... August 4
Applications for admission to Graduate Studies ..... August 30

Applications received after the deadline will be subject to a penalty fee of $10.00 for the first day, plus $1.00 for each subsequent day, up to a maximum of $25.00.

Transcripts

Every applicant should arrange, **prior to the deadline**, for the Registrar of the University (or the Dean of Graduate Studies if he is applying for entrance to that Faculty) to receive an **official transcript** of his high school education (and **two** transcripts of any courses taken at another university or college), **to be sent directly from the Department of Education or other institution maintaining such records.**

Advanced Standing

Students from other universities may be admitted to advanced standing except in the combined courses. Extramural credits from recognized universities may be accepted under certain conditions, but such credits will not be considered beyond the first year of university work. Students who have taken the equivalent of university courses in some other manner may be excused such courses but will not be granted advanced standing in them. They will be required to substitute other courses in order to complete a program of normal weight at this university.

All applications for such admission should be addressed to the Registrar well in advance of the beginning of the session. Each application will be dealt with on its merits. The University reserves the right to require applicants for advanced standing to write examinations at any level including that of matriculation.

The amount of advanced standing that may be granted is limited by the residence requirements of the University of Alberta.

Visé Fees

A fee of $5.00 is charged for the evaluation of educational documents issued in Canada but outside Alberta; the fee is $10.00 for documents issued in other countries. Students entering the Faculty of Graduate Studies are exempt from visé fees.

REGISTRATION PROCEDURES

Limitations on Registration

1. No student may offer for credit in any period of twelve consecutive months more than three courses by a combination of Summer Session, Evening Credit Program or late afternoon classes, and extramural study.
2. In the Faculties of Arts and Science no student, except by special permission of the Council of the Faculty, may offer for credit in any period of twelve consecutive months commencing September 1 more than five courses.

Advance Registration

Registration forms must be completed and returned in duplicate to the Registrar of the University at Edmonton **not later than August 31,** together with the appropriate registration fee. Cheques and money orders must be made payable to the University of Alberta.

Students whose registratoins are approved will receive from the Registrar class admission cards and a statement of fees.

Confirmation of Registration

Students must confirm their advance registration by handing in their class admission cards to their instructors at the first class session they attend.

Change or Cancellation of Registration

After confirming his registration, a student may not change from one course to another, abandon a course, or withdraw from the Evening Credit Program without first obtaining permission from his Dean or Director. This permission, in the form of a "Change or Registration" or "Withdrawal" slip, signed by the Dean or Director, must be presented to the Registrar before the change becomes official.

A student who abandons a course or withdraws from the Evening Credit Program without completing the required forms will not be eligible for any refund of fees, nor for exemption from fees in the event that he has not paid them.

Payment of Fees

Upon payment of fees students will receive an identification card. Registration is incomplete until fees have been paid and is subject to cancellation unless

payment has been made by the final date mentioned in the following regulations.

1. Instruction fees paid for Evening Credit courses will not be credited towards instruction fees for daytime courses except in the cases of students registered in the Faculty of Graduate Studies.
2. Fees should be remitted by cheque or money order payable at par to the University of Alberta—not to any officer of the University.
3. Fees are payable at the time of advance registration. If, for any reason, payment is deferred until after receipt of a fee assessment, fees together with the fee assessment card should be sent direct to the Bursar, University of Alberta at Edmonton.
4. The last date for the payment of fees by undergraduate students is October 15. A penalty fees of $5.00 will be charged on any payment made or postmarked subsequent to that date and must be added to any remittance mailed or delivered to the University. If payment in full has not been made by October 31, registration will be subject to cancellation, and the student to exclusion from classes. There is no provision for partial payments.
5. The last date for the payment of fees by graduate students is October 15 or fifteen days after the date of assessment, whichever is the later. A penalty of $5.00 will be charged on any payments made or postmarked subsequent to that date.
6. In case of non-attendance all fees paid, except the registration fee, will be refunded upon application to the Registrar.
7. If, after confirmation of registration, notice of withdrawal or cancellation of registration is received by the Registrar by November 30, all fees except the registration fee will be returned. If notice is received subsequent to November 30, a pro rata charge from October 15 will be made and the balance refunded except that no refunds will be made where withdrawal or cancellation is subsequent to March 31.

FEES

Undergraduate Programs:

Registration fee, per student	$ 2.00
Instruction fee, per course	80.00
Auditor's fee, per course (see Classification of Students, p. 11)	12.00

Graduate Programs:

Registration fee, per student	$10.00

Instruction fee: Part-time students will be assessed $80.00 per course up to amount of the total instruction fee prescribed for the full program. Part-time students will be subject to an extra assessment of $40.00 for each registration in excess of three. Any outstanding balance will be assessed in the student's final session.

TEXTBOOKS

Students should obtain their textbooks from the University Bookstore at Edmonton. Mail orders will be accepted only on a C.O.D. basis.

ATTENDANCE

1. Regular attendance is expected of students in all courses. Students having an inordinate number of unexcused absences from a course may be refused permission to take the final examination.
2. Absences are counted from the first day of the session.
3. Students who are late for a lecture or laboratory period will be marked absent unless at the end of the period in question they account satisfactorily to the instructor for their lateness.
4. Illness and Physical Disability:
   (a) Students who are absent from two or more consecutive classes in a course because of illness or disability should report the reason to the instructor upon their return.
   (a) Absence from term or final examinations. See paragraphs 5 and 6 of the next section (Examinations).
5. Students who are absent from two or more consecutive classes in a course for some valid reason other than illness should report to the instructor upon their return. If the instructor requires an absence slip, it will me the student's responsibility to have one signed by the Registrar, and show it to the instructor.
6. Students desiring leave of absence in a given course must apply to the Registrar. At the end of such period of absence, the student must present an absence slip for the Registrar's signature.

EXAMINATIONS

1. **Final Examinations.** In courses completed in the first term, final examinations may be held either during the test week in January under departmental supervision, or at the end of the session, at the discretion of the departments concerned. All other final examinations are held at the end of the session.

   Students in the Evening Credit Program normally will write the same final examinations as students in the regular session and at the same time. However, at the discretion of the departments concerned separate final examinations may be approved.
2. **Distribution of Credits.** In each course where a final examination is held, credit of not less than 30% nor more than 70% will be assigned to term work. The remaining credit in each course will be assigned to the final examination.
3. **Pass Marks.** For students proceeding towards an undergraduate degree the pass mark is 50% unless otherwise specified; in courses taken toward a graduate degree the pass mark is 65%.
4. **Debarment from Final Examination.** A student may be refused permission to write a final examination in a course on the recomemndation of the department concerned and with the concurrence of the dean of his faculty in the following circumstances:
   (a) The student has an inordinate number of unexcused absences.

(b) The student has neglected to do a substantial proportion of his written assignments in a course of which these are an essential feature.

(c) The student has neglected to do a substantial portion of the laboratory work in a science course.

5. **Absence from Term Examinations or Tests**. If a student has an unexcused absence from a term examination or test, the mark assigned to him will be zero. However, in case of illness the student may be excused from writing the examination or test. In applying for exemption a student must present to his instructor an absence slip signed by a physician. When exemption is granted the percentage allotted to the examination or test missed will be added to the percentage allotted to the final examination.

6. **Absence from Final Examinations.** Any student who is ill or suffering from severe domestic affliction is advised not to sit for a final examination. Instead he should advise the Registrar at once of the circumstances and should apply for a deferred final examination to be written at the time of the regular supplementals. Similar action should be taken by a student who, because of religious convictions or for other cogent reasons, is unable to write a final examination at the scheduled time. Such application will be referred to the student's dean or director for a final decision.

   If a student becomes ill or receives word of domestic affliction during the course of an examination, he should report at once to the Supervisor, hand in his unfinished paper and request that it be cancelled. Thereafter, if illness is the cause, he must report promptly to a physician so that any subsequent application for a deferred examination may be supported by a medical certificate. The Registrar should be notified of the circumstances in writing within forty-eight hours of the examination.

   Should a student write an examination, hand in his paper for marking, and later report extenuating circumstances to support his request for cancellation of his paper and for another examination, such request will not be entertained.

7. **Statement of Record.** After the end of each University session a statement of record is mailed to each student at the home address specified on his registration form. This should not be expected before June 15.

8. **Reappraisal of Final Examination Papers.** Since great care is taken in the marking of final examination papers, a student should apply for reappraisal of a paper only if he has good reason to believe that a mistake has been made. Reappraisals are dealt with by the head of the department in consultation with members of the staff. A request for reappraisal must be made by letter to the Registrar within thirty days after the publication of results, accompanied by a fee of $10.00 for each paper. The fee will be refunded if the mark is raised from a failure to a pass, or from Class III to Class II, or from Class II to Class I, or by at least 5% within a passing grade.

   The reappraisal privilege is limited to two papers. Normally there is no such privilege for supplemental examinations.

   Students awaiting the outcome of a reappraisal should make application for supplemental examinations by the prescribed deadline.

9. **Supplemental Examinations**. Supplemental examinations are conducted by the University in September of each year. A student granted the privilege of

writing supplemental examinations must do so at the time of regular supplemental examinations next following or, if given special permission by the Dean, write the regular examinations next following. A student who has failed in a course in the preceding session and who has been granted a supplemental examination should apply to the Registrar not later than August 11, remitting the prescribed fee. Except under special circumstances, no student who has written final examinations will be permitted to sit for a supplemental examination unless he has attained an average of a least 50% on the year's work including the failed subject or subjects. Any student who returns to the University, having failed a supplemental examination or having neglected to write it, will be required to repeat the course. In certain cases an equivalent course may be prescribed instead of the failed course. The number of supplemental examinations allowed to any student is determined by the Faculty Council concerned. Notification of permission which may be granted to write one or more supplemental examinations is included in the statement of marks sent to all students.

The percentage of term marks carried forward to a supplemental examination will be determined by the Department and Faculty concerned.

10. **Deferred Final Examination.** A student who has missed a final examination because of illness or domestic affliction or who is obliged to absent himself from an examination for some other compelling reason (including religious convictions) may apply for a deferred final examination to be written at the time of the regular supplemental examinations (see section 6 above).

11. **Examination Fees.**

(a) Final examinations: No fee is levied for final examinations written during the regular examination periods.

(b) Supplemental Examinations: A fee of $10.00 is charged for each supplemental examination written during a regular supplemental examinations period. Applications for September examinations received after August 11 will not be accepted.

(c) Deferred Final Examinations: A fee of $5.00 is charged for each deferred final written during regular supplemental examination periods. The fee for special deferred finals requiring the setting of special papers is $10.00 per paper.

(d) Special Supplemental Examinations: For special supplemental examinations a fee of $15.00 is charged for each subject.

(e) Outside Centres: An additional fee of $5.00 per subject is charged for writing supplemental examinations in established centres other than Edmonton and Calgary.

THE FACULTY OF ARTS

THE GENERAL PROGRAM

Attendance Requirement

A student proceeding to a Bachelor's degree in the Faculty of Arts will be required to complete a program of normal weight in at least one regular session, September to April. Exceptions may be made in the case of teachers who have at least two years' experience subsequent to receiving permanent teaching certificates. Such students may meet the requirements for the degree of Bachelor of Arts by attendance in the Summer Session and the Evening Credit Program. They are warned that the University cannot undertake to offer in summer and evening sessions all the courses required for the Bachelor of Fine Arts or Bachelor of Music degree, or all the courses an individual may desire for the Bachelor of Arts degree.

Course Requirements for the B.A.

First Year

English 200; an Arts course; a laboratory Science course; two options; Physical Education.

Second Year

An Arts course; a Science course; three options.

Third Year

An Arts course; a Science course; three options.

Notes:

1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.A. degree must choose his principal subject of concentration in the humanities or in the social sciences.*
4. To be awarded the B.A., the student must present credit in at least eight courses in the humanities and the social sciences.

Graduation Requirement

To be granted the B.A. degree, a student must present passing marks or better in a minimum of fifteen full courses, and an average of at least 60 per cent in all courses credited towards the degree after the first year.

B.A. AFTER B.ED.

Students who have qualified for the degree of B.Ed. may proceed to the B.A. If they can present credit in thirteen Arts or Science courses, they will be required to complete six additional senior Arts or Science courses, as prescribed

*Either the B.A. or B.Sc. degree may be taken with Mathematics as the principal subject of concentration. Students wishing the B.A. degree should consult the Department of Mathematics concerning a suitable sequence of courses.

by the Faculty of Arts, and attain an average of 60% in these courses. Students with fewer than thirteen Arts or Science courses will be required to take additional courses.

Students who propose to secure the B.A. degree in this manner are advised to consult the Faculty of Arts before registering.

B.A. AFTER B.SC.

Students who have qualified for the degree of B.Sc. may proceed to the B.A. by completing a nine-course program as prescribed by the Faculty of Arts, and attaining an average of 60% in these courses.

THE FACULTY OF SCIENCE

THE GENERAL PROGRAM

Attendance Requirement

A student proceeding to a Bachelor's degree in the Faculty of Science will be required to complete a program of normal weight in at least one regular session, September to April. Exceptions may be made in the case of teachers who have at least two years' experience subsequent to receiving permanent teaching certificates. Such students may meet the requirements for the degree of Bachleor of Science by attendance in the Summer Session and the Evening Credit Program. They are warned that the University cannot undertake to offer in summer and evening sessions all the courses required for the Bachelor of Science degree.

Course Requirements for the B.Sc.

First Year

English 200 or 210; an Arts course; a Science course; two options.

Second Year

An Arts course; a Science course; three options.

Third Year

An Arts course; a Science course; three options.

Note:

1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.Sc. degree must choose his principal subject of concentration in the physical or biological sciences. To be awarded the B.Sc., the student must present credit in at least eight science courses.

Graduation Requirement

To be granted the B.Sc. degree, a student must present passing marks or better in a minimum of fifteen full courses, and an average of at least 60 per cent in all courses credited toward the degree after the first year.

B.Sc. AFTER B.ED.

Students who have qualified for the degree of B.Ed. may proceed to the degree of B.Sc. If they have met the matriculation requirements of the Faculty of Science and can present credit in thirteen Arts or Science courses, they will be required to complete six additional senior Arts or Science courses, as prescribed by the Faculty of Science, and attain an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Science will be required to remove any deficiencies; students with fewer than thirteen Arts or Science courses will be required to take additional courses.

Students who propose to secure the B.Sc. degree in this manner are advised to consult the Faculty of Science before registering.

B.SC. AFTER B.A.

Students who have qualified for the degree of B.A. may proceed to the degree of B.Sc. by completing a nine-course program as prescribed by the Faculty of Science and attaining an average of 60% in these courses. Students with incomplete matriculation for the Faculty of Science will be required to remove any deficiency.

FACULTY OF EDUCATION

THE STANDARD ELEMENTARY ROUTE PROGRAM

The following revised program came into effect September 1, 1963. With the permission of the Dean, students who commenced work on a B.Ed. degree prior to that date, may transfer to the new program if they think it is to their advantage to do so.

Major Fields

Each candidate must select a major field of study. A major consists of four prescribed courses, usually three Arts or Science courses, and an Education course. The following majors are available: Art, English, Early Childhood Education, French, Mathematics, Music, Physical Education, Science and Social Studies.

Degree Program for Certificated Teachers

(Elementary Route)

For detailed information, students should consult the Calendar of the Faculty of Education.

First Year

Credit granted on the basis of at least seven months of teacher education.

Second Year

1. English 200 or 210
2. Major

3. Major
4. Arts or Science option
5. Arts or Science option
6. Senior Education option

Third Year

1. Educational Psychology 476
2. Philosophy 240 or 246
3. Major
4. Approved Arts option in social science or history
5. Approved Arts or Science option

Fourth Year

1. Educational Foundations 492
2. Major
3. Arts or Science option
4. Senior Education option
5. Senior Arts or Science or Education option.

Notes on the Program

1. The following courses, which are being offered in the 1964-65 Evening Credit Program, may be presented as approved options under item 4 of the program for the third year: Economics 200, Geography 201, Sociology 202.
2. Graduation Requirements:
   (a) An average of at least 60 per cent on all courses taken at the University of Alberta.
   (b) Students must include in their programs an approved Arts or Science option from each of two of the following six fields: Art, drama, mathematics, music, physical education, and science.
3. The following courses, which are being offered in the 1964-65 Evening Credit Program, may be presented in fulfilment of requirement 2(b): Art 230; Geography 201, 303; Mathematics 274, 374.

THE STANDARD SECONDARY ROUTE PROGRAM

The following revised program came into effect September 1, 1963. With the permission of the Dean students who commenced work on a B.Ed. prior to that date may transfer to the new program if they think it is to their advantage to do so.

Major Fields

Each Candidate must select a major field of study consisting of seven courses —a core of five prescribed courses and two supporting courses. The following major fields are available: English, French, German, Latin, Social Studies, Mathematics, Biological Science, Physical Science, Art, Music, Drama, Household Economics, Business Education.

Degree Program for Certificated Teachers

(Secondary Route)

For detailed information students should consult the Calendar of the Faculty of Education.

First Year

Credit granted on the basis of at least seven months of teacher education.

Second Year

1. Major
2. Major
3. Education CI Methods
4. English 200 or 210
5. Arts option in social science or history
6. Major
7. Major or Arts or Science option.

Third Year

1. Educational Psychology 476
2. Philosophy 240 or 246
3. Major
4. Major or Arts or Science option
5. Senior Education option

Fourth Year

1. Educational Foundations 492
2. Major
3. Senior Education option
4. Major or Arts or Science option
5. Major or Arts or Science option.

Notes on the Program:

1. At least three courses in the major field must be completed by the end of the second year.
2. Graduation Requirement: An average of at least 60% on all courses taken at the University of Alberta.

FACULTY OF COMMERCE

The curriculum in the Faculty of Commerce is based upon a four year program. During the third and fourth years of the program the student may pursue a general course or may major in Economics, Accounting, Personnel, Finance, Production or Marketing.

The first two years of the program may be completed through the Evening Credit Program. The final two years may be taken only in the regular Winter Session.

THE BACHELOR OF COMMERCE PROGRAM

First Year

Accounting 200
Business 202
Economics 200
English 210 or 200
Approved course in Mathematics or an Arts or Science option

Second Year

Business Law 310
Psychology 202
Statistics 354 or 255
Philosophy 260 or an approved option, or an Arts or Science option
Business 320

DETAILS OF COURSES

Notes:

1. The University reserves the right to restrict registration in, or to withdraw, any of the courses here outlined.
2. The number of hours of instruction per week is shown at the top of each course description. The first figure in a set of two indicates lecture-hours; the second, laboratory hours. The letter "L" attached to a figure signifies lecture-laboratory- hours, and the letter "S" seminar hours.
3. Only courses marked with an asterisk (*) may be presented for credit on B.A. or B.Sc. degrees.

ART

***Art 230** (1-4; 1-4)

Fundamentals of Design—The study and practical application of principles of composition and picture-making, methods of construction in design, and the use of conventional and abstract forms.

***Art 240** (3-3; 3-3)

Fundamentals of Drawing—Theory and practice, analysis of masters' drawings; study of line, form, light and shade; portrait and figure construction; life drawing, using both long and quick poses.

BUSINESS LAW

Business Law 310 (3-0; 3-0)

Commercial Law—An introduction to the study of commercial law with special reference to the law of contracts; bills of sale, chattel mortgages and conditional sales, sales of goods; bulk sales; contracts of hiring; contracts of carriage including bills of lading; negotiable instruments; guarantees; real property; commercial associations including companies, partnership and agency; master and servant.

ECONOMICS

***Economics 200** (3-0; 3-0)

Principles of Economics—A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy.

Prerequisite for all senior economics courses except 310, 311, and 330.

***Economics 390** (3-0; 3-0)

Comparative Economic Systems—A comparative study of the institutions and theories of important contemporary economies and systems of economic organization, with emphasis on the "mixed" capitalist system, "command" economies of the Soviet type, and transitional systems embodying socialist as well as capitalist principles. A survey of socialist economic thought with emphasis on the economics of Marx.

Prerequisite: Econ. 200.

EDUCATION: Curriculum and Instruction

Ed. CI 314 (3-0; 3-0)

Music in the Elementary School—Comparative study of curricula and method; appraisal of instructional materials; further development of classroom

performance skills; special problems in music education.
Prerequisite: A course in music methods and a course in music (e.g., Education 234, Music 200, 210), or consent of the Department of Elementary Education.

Ed. CI 362 (3-0; 3-0)

Audio-Visual Education—Theory of audio-visual education; types of communications media available for instructional purposes; principles and techniques of teaching with such media; examination and preparation of audio-visual materials; experience in the operation and care of specialized equipment.

EDUCATION: Educational Foundations

***Ed. Fdn. 414** (3-0; 3-0)

Sociology of the School—Study of the school as a social institution in the changing society.

***Ed. Fdn. 492** (3-0; 3-0)

Philosophy of Education—Philosophical bases of education, with particular reference to values, aims, curriculum, and the educative process.
Prerequisite: Philosophy 240 or 246.

EDUCATION: Educational Psychology

Ed. Psy. 310 (3-0; 3-0)

Personal Adjustment in Education—Dynamics of behavior, emotional and social adjustment of school children; teacher adjustment; social adjustment in the classroom.
Prerequisite: Ed. Psy. 276 or equivalent.

***Ed. Psy. 476** (3-0; 3-0)

Educational Psychology—Individual differences; psychology of learning and forgetting; motivation; personality, adjustment, and mental hygiene; introduction to evaluation and the testing program.
Prerequisite: Ed. Psy. 276 or Psychology 202 or equivalent.

Ed. Psy. 478 (3-0; 3-0)

Measurement and Evaluation—Measurement of classroom achievement; teacher-made and standardized tests; interpretation and use of test results; evaluation of non-academic achievement; recording and reporting pupil progress.
Prerequisite: Education 276 or equivalent.

Ed. Psy. 570 (3-0; 3-0)

Child Psychology—A systematic study of the growth, development, behavior and problems of adjustment of children of pre-school and elementary school ages.
Prerequisite: Ed. Psy. 476.

ENGLISH

***English 200** (3-0; 3-0)

English Literature from Chaucer to the Late Eighteenth Century—A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

***English 332** (3-0; 3-0)

Shakespeare—A study of Shakespeare's development as a dramatist. Eighteen plays will be discussed, not all in great detail.
Prerequisite: English 200 or equivalent.

English 398 (3-0; 3-0)

Children's Literature—A historical and critical study of literature written for children with attention to the interaction between children's literature and educational theory. The course will bring to the attention of prospective elementary teachers some of the world's resources in good books for children.
Prerequisite: English 200 or equivalent.

Notes:

1. This course is restricted to B.Ed. students in the Elementary Route.
2. This course may not be presented for degree credit in the Faculties of Arts and Science.

FRENCH

***French 200** (3-1; 3-1)

First Year University French—This is an intensive course in reading modern French, French grammar and composition.
Prerequisite: Grade XII French or French 100.

French 330 (3-0; 3-0)

French Language and Civilization—Pronunciation: sounds of the French language; the International Phonetic Alphabet; drill in basic speech patterns. Grammar: a general review with emphasis on those constructions in which French usage differs from English; translation from French to English and from English to French.
Civilization: aspects of contemporary French life and letters; specimens of post-war prose and verse.
Prerequisite: French 200.

Note:

This course, designed for teachers and prospective teachers, will **not** overlap, or serve as a substitute for, Education CI 263.

GEOGRAPHY

***Geography 201** (3-2; 3-2)

Physical Geography—A systematic study of the origin, nature, and distribution of the natural environment. Land forms, weather and climate, vegetation, soils, water, and mineral resources will be related to each other in place. The laboratory work will complement the lectures and will include interpretation, study, and preparation of maps and charts.

Note:

Geography 201 is classified as a science course.

***Geography 303** (3L-0; 3L-0)

Weather and Climate—A systematic study of weather processes and phenomena, regional weather patterns, climatic classification, and climates of the continents with some consideration of climatic trends. Laboratory work will include the interpretation of weather and climatic maps and local weather patterns.

Prerequisite: Geography 201 or consent of the instructor.

Note:

Geography 303 is classified as a science course.

HISTORY

***History 360** (3-0; 3-0)

The United States, 1492-1941.

MATHEMATICS

***Mathematics 274** (3-0; 3-0)

Algebra and Geometry—Logic and sets. Axiomatic geometry. Projective geometry. Rotation of axes. Graphs of polynomial functions. Linear equations. Vectors, matrices and determinants. Mathematical systems (scales of notation). Mathematical induction. Binomial theorem. The axiomatic approach to the number system. General algebraic systems.
Prerequisite: Mathematics 30 of High School.

***Mathematics 374** (3-0; 3-0)

Algebra and Geometry—Selected topics in projective and other non-euclidean geometries. Groups rings, fields. Vector spaces. Lattices and Boolean algebra.
Prerequisite: Mathematics 207 (or equivalent) and 274.

NURSING EDUCATION

N.Ed. 453 (3-0; 3-0)

The Hospital Nursing Service—Principles of organization and administration applied to selected departments of the hospital; principles, practices, and problems of ward management; supervision as it relates to the improvement of nursing.

PHILOSOPHY

***Philosophy 240** (3-0; 3-0)

Introduction to Western Philosophy—The course is designed to introduce the student to the main problems and theories that have dominated philosophical thought in the Western world, through the study and discussion of selected philosophical classics. Emphasis will be placed both upon a sound acquaintance with the main outlines of our philosophical tradition and upon the ability to handle philosophical ideas independently. To this end both lectures and discussions will form part of the student's training.

POLITICAL SCIENCE

***Poli. Sci. 310** (3-0; 3-0)

History of Political Thought—A historical and critical survey of the development of political and social philosophy from Ancient Greece to the present time, with selected readings from major political writers.

***Poli. Sci. 340** (3-0; 3-0)

Soviet Government: Theory and Practice—A study of Soviet political and social theory; and an analysis of the Soviet political system, with special reference to: The Communist party, political institutions, federalism, foreign policy.

***Poli. Sci. 391** (3-0; 3-0)

Parties and Pressure Groups—A study of the role of political parties and pressure groups in the governmental process.

PSYCHOLOGY

***Psychology 202** (3-0; 3-0)

Introduction to General Psychology—A survey of problems, methods and principles in various fields of psychology.

SOCIOLOGY

***Sociology 202** (3-0; 3-0)

Introductory Sociology—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes; analysis of society in terms of its structure, culture, and social ranking schemes; examination of the interrelationships between the various institutions (e.g. family, church, school, government), the processes whereby the individual becomes a human social animal and a member of society, and the sources of conformist and non-conformist behavior.

***Sociology 341** (3-0; 0-0) (half-course)

Social Psychology—An introduction to the study of individual and group behaviour observed in social processes.

***Sociology 346** (0-0; 3-0) (half-course)

Public Opinion—A study of the nature of public opninion, factors involved in the formation of public opinion, and the roles of advertising, propaganda and education techniques in modern society.
Prerequisite: Sociology 340 or 341.

***Sociology 360** (3-0; 3-0)

Social Class in Modern Society—An analysis of social stratification in western society, with reference to the effects of industrialization, and including comparative analysis of primitive societies. Special attention given to the basis of stratification, the structure and function of social class systems, social mobility, and the special classes in modern society, such as the "managerial class" "labor", and "power elite", etc.

***Sociology 380** (3-0; 3-0)

Minority and Ethnic Group Relations—A study of the problems arising from racial and minority status. An analysis of the sources of prejudice, current theories of race and culture, and the effect of interracial and minority group contacts. An examination of critical situations requiring adjustment and social treatment.

TEXTBOOK ORDER FORM

Evening Credit Program, 1964-65

From .....

Address .....

.....

To. University Bookstore, Edmonton, Alberta.

Please forward the following books, C.O.D.

Course	Textbook(s)

Do not send payment with orders.

University of Alberta Library
0 1620 0634 9367